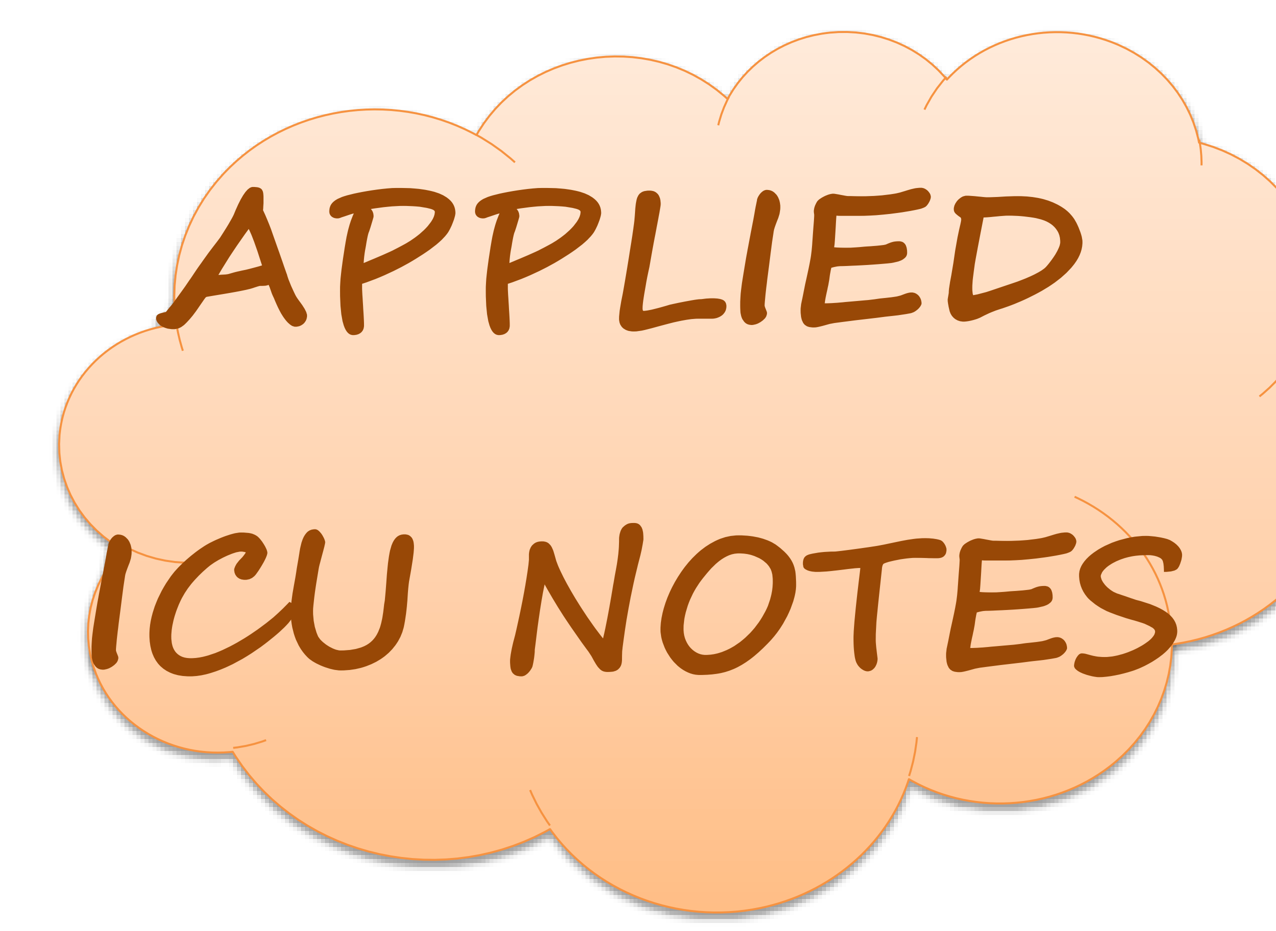


10/2021

- الحمد لله ... الحمد لله ... الحمد لله
- جزى الله والدينا عنا خير الجزاء ، وجزى الله كل من علمنا أو ساهم في هذا العمل خير الجزاء .
- **كل كلمة مكتوبة وبالترتيب المكتوب في الملزمة في عيانين تضرروا قصادها فبعد إذنك بلاش اجتهادات شخصية واهتم بكل كلمة مكتوبة ومتقولش دي ملهاش لزمة .**

- **نصيحه خلص مذاكره قبل ما تيجى رعاية الطوارئ (علشان هتعرف هناك قيمة الوقت)**

- **تتحفظ عناوين كبدايه وتفتحها على طول ,مع الوقت هتجيبها كلمه كلمه من الذاكره ولازم تكون العناوين حاضره فى ذهنك وتكون لماح وتلقط العيان الخطر زى عيان فاتح بوه , باصص عكس الفنتلاتور ,......**

- **اول مره تسمع الشرح لومش فاهم اسأل مليون مره ومتقولش دي ملهاش لزمة وفصص الكلام لاجزاء صغيره مفهومه مترتبه فى دماغك(العلمُ يضيع بين مستحٍ ومتكبر)**
- **الهدف من وجودك التيسير علي خلق الله ، تسريع عن طريق الاتصالات او شغل اضافي من سعادتك.**

- **فى حوادث الجراحة اول ماتعرف ان العيان هيحتاج رعايه ابدأ فى تجهيز طلوعه وبلغ الرعايه لحد ما يخلص اذن القبول وده بياخد تقريبا ساعه يكون العيان خلص عمليته ويتنقل على طول ولو فى مشكله فى طلوعه كلم الكبير فى الرعايه لأن تأخير طلوعه هيأخر المضاد الحيوي+ عنيفةhypothermia**
- **لازم نتذلل علشان المريض خصوصاً لو قريب حد نعرفه لحجز CT/MRI روح بنفسك ،ماتخليهوش هو يروح علشان محدش يضايقه في موقف هو حساس فيه لأي كلمة .**
- **مفيش حاجة اسمها عيان مات فجأة..لازم تكون تعبت معاه ة إلا تبقي مُقصر فى حقه و تصوّر المونتيورعشان تشوف ال trendلازم المونتيوريكون شغال كويس لو فى مشكلة تاخد مونتيور عيان الـmost stable or not for CPR**
- **أى عيان تعبان أو مقلق منه=balance/ 4hrs+ABG**

- **ما يُهوِّن ← من يكتب له الله الشفاء علي أيديكم (ومن أحياها).**

← إن junior بتاعك يبقي شاطر .

Counting down←

دخول العيانين .... أول ما تتبلغ إنه داخل Be ready:

a)Equipments

1.Ventilator with adjusted settings(ARDS or standard) والوصلات

2.Infusion pumps.

3.Echo ,ECG , cardiometry.

4. Monitor

5. جهاز السكر

6.tubes.للمعامل

7. two blankets .

B) paper work

1.ورق العلاج(12+8)

2 .ورق المحاليل(5+5)

C) الإحسان يتاخدو من تحت + كل ال Antiيتاخدوا علي الترولى بايدك .

- **اي عيان هيركب ماهوركر :**

1.أذن قبول .

2. CBC,plateltes, INR (bleeding profile)

K ,Blood gases(ألحق أصلح الحاجات اللي هتموته قبل ما أدخل e.g

(antihyperkalemic ,HCO3

3.الأدوات(الجهاز،خيط ،2جوانتى،جاون ان أمكن،فرش مع المريض مش من الرعاية)

4.النايب أو الأمتياز .

5.high risk consent

6.لو العيان جربو فيه فى الاستقبال يتصور x-rayقبل ما يطلع.

الملزمه عباره عن تجميعات لاخر guidelines فى كل موضوع مش كلام لشخص معين

لما تتسأل عن حاجه بتقترح بأدب وتقول قريتها فى مكان معين ولا تذكر اسم اى شخص

- اول ماالعيان يدخل لازم تسيطر على ال **ABC+satisfactory blood gases**

(**if Satisfactory A&B shift to C , if C is accepted search for acute &chronic problem**)

يعنى تلصم كل حاجه بسرعه ←اعلي بال levo بسرعة ←إزازة محلول ← 100%

وتشوف اللى بعدها بحيث انك ربع ساعه تكون لامم كل حاجه فى العيان وبعدين التفاصيل

A & B= **If not life threatening SO2 &RR& pattern of breathing, shift to the next step**

A

⟹ **1) *Intubated***

a) on ventilator (1+2+11)

⟹ **2)Non Intubated = indication of intubation p63…. Intubation(3+3) p 76 +correct reversible causes**

B

Breathing=R.R,chest expansion,pattern, blood gases , O2 Sat.(O2mask ولا على هوا ربنا)+ vent. setup

3) *+DD of hypoxia* p (27)→

a) to avoid ventilation if possible as in COPD & cardiogenic pulmonary edema(CPAP mask) , and effusion or pneumothorax (chest tube insertion) or fracture ribs (pain management first) and others

b) adjustment of the ventilatory settings as TV&PEEP

4) Satasfactory blood gases : تظل مهمه جدا حتى لو الباقى كويس بس لحد ماتيجى تنجز الباقى

(acc to type of patient eg in↑ ICT co2 30-35 , in aneurysm normal co2, Others)

And if not satisfactory search for the cause

NB:if trauma= management of cervical spine and pneumothorax

لو ماكنتش واثق او كنت خايف حط انبوبه(بشروطها 6 items)
امتى تكون خايف ؟ ؟ زى ال weaning ولو فى كذا risk factor حط انبوبه لو فى one factor ممكن
تصبر شويه خاصة لو reversible, الا لو فى combind metabolic &respiratory acidosis حط انبوبه

C =acute & chronic problems لو ضغط ونبض كويسين انقل على اللى بعده علشان تطلع ال

1) **IV accsee** بركب الأسرع **wide bore canula or CVP**
volume assessment in (shock &AKI&tachycardia&burn) =Static, dynamic, clinical,type of fluid(vol.,line,type,route,duration) , time factor is very important (in short time 30-60 min.)

2)Blood PressureMAP=diastole +1/3(S-D) max.max.وأtargetالعيان يكون ماسك ضغط أو وصلت ل

target in bleeding mean 50(unlessTBI), in shock 65 unless hypertensive 85 for 2 hrs and reassess p(121) confirm pulse بايديا ...perfusion ...cuff size

3)Perfusion= capillary refill time, UOP, lactate .

4)surgical control

5)+ DD of shock p (114)→ to determine:

a) the type of inotropes eg levo in cardiogenic,adrenaline in spinal if brady or anaphylactic shock.

b)fluid management acc if there is any limitation or not

NB: if trauma management of D& E& F (system هيبقى فى كذا)

- **تبقى عارف فى خلال نص ساعه بعد ماتكون خلصت systematic examination**

Acute & chronic Problems p(7-8-9)

a)Diagnosis

b) TTT

c)Anti ال : الادويه تتاخد على التروللى وانت واقف عشان التمريض هيديها تاني يوم

→ Antibiotic →antihypertensive

→antiepileptics →antihyperkalemic

±Anticoagulant &antiplatelets ??? if highly indicated

- طلع كل system على بعضه وامسك مشكله مشكله فيه وتبدأ ب
Respiratory then CVS
- كل مشكله تفتح صفحتها وتتعامل مع كل واحده وبعدين تعيد ترتيبهم على العيان , العيان مش صفحه هو كذا حاجه وانت بتجمعهم مع بعض ,الهدف انك تنور فى دماغك العناوين والمفروض التفاصيل هتكون كامله فى دماغك بس لو جمعت حتى 70% هتفيد العيان وهتبقى حاجه تفرح☺

- كلام المرور يتنفذ بالحرف دون النظر إلي رد إشارة النايب ال junior دفعتك .
اتكلم عن العيان مش الملزمة.

Management of critical care patient

Acute &chronic problems دى سبب دخول المريض الرعاية

- NB.Acute every day event,as critical pt is very dynamic
- الغى احساسيك الشخصيه خالص مع كل eventجديد بتعيد ال DDمن الاول
- تمر على كل systemوتعلم على كل items
- كل مشكله تطلعها لازم تعملها DD&TTT

➢ Acute problems الادويه بتتاخد بإيدك وانت واقف على العيان Check list (Yes or No) لازم ينور في دماغي العناوين و بعدين التفاصيل

1-Respiratory	2- CVS
✚ DD of Hypoxia (30) Tachypnea(90-110), resp alkalosis (110) ✚ ARDS(90) ✚ Complicated tracheostomy(57-59) • Early obstruction (58) • Wash(59) Weaning(59) • Orifice narrowing(59) ✚ Complicated Chest tube(60-62) • Persistant pneumothorax(61) • Air leak(61) TOF(61) • Pneumomediastinum (61) • surgical emphysema(61) • oscillation (61) transport(62) • recurrent pneumothorax(61) • pleural effusion(61) • hemothorax(61) ✚ Flail chest & chest contusion(99) ✚ Fracture ribs(99) ✚ Chest infection(99) ✚ Ventilator associated pneumonia (98) ✚ Management of Hypoxia ±ARDS(99) ✚ Unsatisfactory blood gases(102) ✚ TV less/more than setting (69-70) ✚ ETT • Bleeding tube (79) • Pediatric tube obstruction (79) • Tube insertion(76) • Tube exchange (77) • Tube obstruction(77)	➢ Shock (114) • Hypovolemic (114) • Active bleeding(119): ▪ Abdominal collection(120) ▪ Visual bleeding(120) ▪ Liver tear e pack(120) ▪ Pelvic fracture(120) ▪ Brain injury(120) • Distributive(123) • Obstructive(122) • Cardiogenic(122) ▪ Contractility , Rythm ➢ Chest pain(133) • MI(135) • Dissecting aortic aneurysm(133) • Pancreatitis(132) • Perforated peptic ulcer (133) • PE(149) ➢ Arrythmia(151),Tachycardia(151) ➢ AF(152) ➢ SVT(161).heart block (161) ➢ Hypertensive emergency(51) ➢ Infective endocarditis(186) ➢ Limb ischemia(229)= reberfusion • Embolectomy , By pass(229) • Aortic surgery(229) • Electrical burn (229) ➢ Pulmonary edema(122) ➢ Pulmonary embolism (149)

3-CNS

- DCL(198)
- TBI(196)
- Convulsions(206)
- Delirium (208)
- Fracture spine(196)
- Cerebralaneurysm=Subarachnoid hge(205)
- Paralysis (198)(mono-para)
- Stroke(213)
- Meningitis(212)
- Contusion(205)
- Pneumocephaly&ICH(205)

4-Sepsis &septic shock(119)

(think about sepsis in the following):

- Tachycardia
- Tachypnea
- Failure of weaning
- Arrhythmia not responding to drugs

5-GIT

- Vomiting(31)
- Leakage(including drain)(31)
- Wound→dehiscence or infection (31)
- Stoma→non functioning or retracted(31)
- Pancreatitis (132)
- Splenectomy (vaccine.plt.bleeding)(121)
- Ryle→non functioning :intake or drainage(268) Drugs&ryle(269)
- Nutrition(262)
- Intra-abd. Pressure (121)

6-Hepatic

- In HCV patients→keep your eye on platelets,INR,Na,&albumin if abnormal suspect liver Cirrhosis(239)
- Hepatic encephalopathy(240)
- Hematemesis(241)
- Hepatorenal syndrome(243)
- Spontaneous bacterial peritonitis(242)
- Hepatoadrenal syndrome(243)
- Hepatopulmonary syndrome(243)
- Acute liver cell failure(245)
- Liver transplantation(246)

7- Renal

AKI(220)

8-Endocrinal

- DKA(232)
- Hyperosmolar(236)
- Addisonian crisis(123)
- Hypothyroid(123)

9-Back&LL

- Bed sores(45)
- DVT(49)
- LL Ischemia(229)

10-Labs

- ↑or↓ Ca(226)
- ↑or↓ K(225)
- ↑ or↓Na(210)
- Acidosis &alkalosis(102)
- Thrombocytopenia (33)
- Anemia (33)
- ↑liver functions(239)
- ↑kidney function (220)

- Agitation
  - تربيط العيان (46)
  - Drugs(46)
- العيان المكسور(46)
- الشده(46)
- تثبيت الانبوبه(46)

- Post arrest(164)
- Antibiotics(176)
- Burn (167)

☞ For any acute problem → diagnosis & treatment . الادويه تتاخد بايدك وانت واقف على العيان

☞ Consider the possibility of multifactorial etiology for acute problems → continue the whole differential diagnosis (acc to algorithm)→ e.g, combined septic & cardiogenic shock.

لو في حاجة تمنع الـ diagnosis حاول تشغل دماغك ... مثلاً عيان Hepatic + DCL + high inotropic support ... حالته متسمحش تنزله يتصور CT brain ... هتعتبره hepatic encephalopathy ... بس لو عنده signs of lateralization يبقى غالباً في حاجة central وساعتها خد الريسك وانزل صوره .

➢ Chronic problems:

- diabetes(40)
- hypertension(44)
- IHD(143)
- CKD(230)
- chronic liver disease(239).

CONTENTS

INTRODUCTION

- الرعاية ليها شق إداري وشق طبي .
- الشق الإداري لو مش متضبط كويس عُمر الشق الطبي ما هيبقى كويس (انت وضميرك)؛ مثلاً intubation box, crush trolley, CVL insertion tray, opioids وصيانة الأجهزة والمونيتورز ، وتوزيع التمريض ومخزن ومستلزمات ومعدلات صرف وورقيات و patient files و data system ؛ لازم في حد معين مسئول عن الكلام ده بمتابعة حد من الدكاترة .
- لا تظن إن دي حاجات أساسية دايماً موجودة by default .
- لو مفيش regular check up هتيجي في وقت مش هتلاقي منظار شغال أو أدوات تركيب CVL أو غيره
- **ثق تماماً إن أي شخص هتديله مهمة وتسيبه من غير ما تراجعه يومياً لمدة أسبوع هيوقعها .**
- لازم team أي رعاية يتقابل بانتظام ويتكلموا بانتظام ويبقى ليهم جروب واتس .
- لو مفيش حاجة بتزق الرعاية لقدام (أجهزة وغيره) مع الوقت هترجع لورا .
- الشق الطبي هو الملزمة دي والمذاكرة .
- الهدف من الملزمة دكتور شاطر يستطيع استخدام كل الأدوات ويستطيع **الاعتماد على نفسه** في حالة وجود أعطال .
- عشان ننجز حاجة العيانين اللي محتاجينها من التخصصات التانية 1:بنستأذن كبير التخدير في اللستة ياخد رأي استاف كبير ويسرع الموضوع ؛ 2:أو بنكلم حد تخدير ليه قريب في التخصص اللي عاوزينه ؛ قلب أو أشعة أو غيره ,3: اتحايل جامد كأنه واحد من اهلك4: كبير يكلم كبير فى وقت مناسب يعنى ماينفعش تقول عندى مشكله فى الصيدليه الساعه 3 العصراو اى مشكله الخميس العصر لان الجمعه اجازه لازم تبلغ من الصبح علشان يعرف يتصرف

- اسعى بضمير في تخليص حاجة العيانين بحيث تكون مقضية خلال 48 ساعة ؛ ومتحكيش مشاكلك الشخصية, ثقوا فى نفسكم وعاملوا ربنا واجتهدوا فى العيانين اكيد هتوصلوا.
- (انت و ضميرك)←اجعلها لله لعل ربنا سبحانه و تعالي ينجينا .

Yes = patient benefit

1.الحاجة اتعملت 2.واتبص عليها 3. والعيان استفاد 4.معاك اثبات

5.في أسرع وقت ممكن (من 6 لـ 8 المغرب لازم المعامل تكون اتسجلت وبتتصلح وتسحب الجديد)

6.أبلغ المدرس المساعد بالنتيجة بسرعة(اقتراح بأدب)

No = عقاب + أعذار (مشاكل شخصيه)

السرعه بتفرق مع العيان, كل لحظه بدرى بتفرق جدا معاه فوق ماتتخيل مش لازم يموت معاك عيانين علشان تستوعب ده

● لازم أي مشكلة في العيان يتسيطر عليها خلال ساعة على أقصى تقدير سواءً ABC, AKI, TBI, etc ؛ غير كده يبقى انت عندك مشكلة .

● المفروض في الرعاية تكون كل حاجة متوفرة زي الكتاب ما بيقول ، لكن لو في نقص حسن التصرف بينقذ أرواح ؛ يعني مثلاً لو بتحط أنبوبة واكتشفت إن الشفاط مش شغال ؛ حرك العيان ناحية أي شفاط شغال في القاعة .

● في البرايفت أي عيان يتعرض ع الرعاية لازم يتحجز 24 ساعة ع الأقل تحت الملاحظة ؛ ولو طلع مش محتاج رعاية يخرج ؛ لأنه لو مدخلش الرعاية وطلع فيه حاجة بعد كده هتحصل مشكلة .

● في المستشفيات الحكومية لو مزنوقين في السراير بنقيم العيان في قسمه الأول قبل ما ندخله او بنشوف اكتر عيان stable حسب المعروض بتوزنها وحد كبير يقرر.
(اى عيان مش بالانبوبه ولا على inotropes ممكن يخرج حسب المعروض)

● لما يكون في major event زي intubation, vasopressors, change of antibiotics, sepsis, etc تكلم استشارى الرعايه وال primary consultant فورا وضرورى جدا عشان أهل العيان هيكلموه على كل حاجة في الحالة لأنهم ميعرفوش غيره ، وأي سؤال ليه علاقة بالعملية بنقولهم يسألوا الجراح حتى لو عارفين .

N.B: (good clinician)فى

- اى عيان فجأه لقيت 1)ال lactate بتاعه عالى
2) tachypnea & tachycardic
3) فاتح بؤه
4)باصص على الناحيه التانيه من الفينتيلاتور او بيخبط بالايد واحده أو مربط ناحية واحدة (بقي عنده hemiplegia)
5)من قوة الملاحظة تلقط الرايل بره و الأنبوبة بره.

بص عليه بصه بضمير اكيد فى مشكله و missed منك

Good clinician: *لازم تعرف كل أمبول كام ml و كام mg*

→chest expansion على عيني + pulse(rate,rhythm,volume)= good clinician التخدير كله

● يستحسن ميبقاش في خلاف بين الدكاترة اللي بيعالجوا العيان ؛ فمتقفش ع الحاجات البسيطة إلا لو حاجة ليها تأثير ع الـ outcome .

●لما تدى اوردر للتمريض لازم تقوله 1-الجرعه و2-التركيز و3-هيتحل ازاى (وبرغاوى ولا لأ)،و4-علي إيه (saline, glucose, ringer)و5-هيدى اد ايه منه واللى 6-فاضل بيترمى ولا يتشال فى الثلاجه حسب ال stability بتاع الدوا (volume, type of solution , rate) **وفى الاطفال لازم تكتب الجرعة mg/day وبعديت تقسمها.

● احترم المريض الكبير في السن ممكن يكون قريبك , خلي بالك ان التخين ده مش ذنبه والأطفال اللي امهاتهم مهملات بلاش تسخر منهم وكمان المدمن ده انت ممكن تبقى مكانه .. من الأخر كل المرضى في عينينا

● فى المنيل والبرايفت العيان اللى بيجى postoperative monitoring وماحصلش events intraoperative بنسحب CBC & Na & K only لان تكلفة ال full labs حوالى 1500-2000

●في المنيل لازم تعرف ان السونار بتجيبه من الاشعة بوصل في أي وقت .عشان اعمل الحاجة للعيان في ظرف ساعة مش لازم تستني سونار محجوز ولازم تعرف ارقام الصدريه وانف واذن وفى الخاص لازم تعرف جدول ال oncall.

الطب ..... Individualization

-It depends on : Genes , Habits & Environment .

-There is guidelines but you can modify according to your patient depending upon your experience.

ممكن تستعين ببرامج زى MDCalc

التعامل مع أهل العيان

- لو أتقنت التعامل مع الأهل هتتجنب مشاكل كتير جداً جداً .
- طبطب على أهل العيان:

1-بحزم وثقة تعرفهم بنفسك (أنا دكتور فلان و أنا اللي ماسك الحالة) و ما تستخباش وقت الزيارة.

2- مقدر حجم الابتلاء وإنهم هيؤجروا عليه .

3- توضح لهم سبب دخوله الرعايه .زى مثلا الأمراض المزمنة اللي عنده زي السكر والضغط والقلب والكبد والكلى وغيره من الأمراض الموجودة عنده وكانت مهملة ، أو المرض الطارئ اللي حصله زي تسمم في الدم نتيجة انفجار في الأمعاء أو غرغرينا في الساق أو غيبوبة ، أو نتيجة الحادثة اللي عملها وأثره على اى اجهزه تانيه فى جسمه .بتفهمهم خطورة الحالة بنسب مئوية مرتفعة ؛ مثلا يعني تقولهم في 70% خطورة على حياته في أول 24 ساعة ؛

a)chronologically **b)systematic**

c) percentage of mortality : **→3 systems affected →→90%**

→ 2 systems affected →→60% **→1 system affected →→30%**

4-هتبذل قصار جهدك معاه انت والجراحه علشان تخرجوا به من ال GREY ZONE وهنعالجه بكل ما نملك وناخد بكل الأسباب ؛ لكن زي ما في أسباب الأرض في أسباب السماء .

- متعملش attack لنفسك بغباوة ملهاش مبرر ؛ متقولش مثلاً إن العيان جاله التهاب رئوي بسبب جهاز التنفس الصناعي ؛ انت بتبرز وتوضح إن حالته متدهورة لنفس سبب دخوله الرعاية .
- لو العيان محتاج أشعة أو فحوصات معينة مش بنبلغ الأهل بيها غير وهي على وشك إنها تتعمل وكذلك في عرض العيان على استشاري تخصص معين مش بنبلغهم غير بعد ما الاستشاري يمر عليه ؛ لأن لو اتبلغوا قبل كده وحصل تأخير لأي سبب هيبدأوا يسألوا ويعملوا مشاكل لو الحاجة اتأخرت أكثر ؛ وبنفهمهم إن احنا عملنا كل حاجة ممكنة للأجهزة المختلفة .

- في البرايفت أي مشكلة لقيتها في العيان وانت بتحجزه في الرعاية زي bed sore بتسجلها وتمضي عليها أهله عشان ميحصلكش مشكلة .
- دايماً بنحط الأهل في Grey zone ؛ لو العيان متكحول يبقى ناحية الـ Dark grey ولو العيان كويس يبقى ناحية الـ Light grey حتى لو هتخرجه تاني يوم لأنه أكيد لسه قاعد عشان حاجة معينة فلو تدهور فجأة لا قدر الله تلاقي حاجة تقولها للأهل .
- الجعجعة في وجود جماهير عريضة أو ناس عصبيين غباء غير طبيعي !
- في لحظات بتبقى لحظات امتصاص وتقدير الفاجعة , الموت له رهبه .
- من وظايفنا إننا نفهم أهل العيانين ومنستخباش وقت الزيارة ، ولو عددهم كبير اطلب اثنين أو ثلاثة على جنب تفهمهم الحالة .
- لو العيان مات والأهل بتوع مشاكل والرعاية شكلها هتتكسر نبه ع التمريض ميبلغوش بأي تطورات في الحالة ولا تعلن الوفاة غير في وجود الأمن والرعاية مغلقة .

EXTRAS

استلام الرعاية

1. ظرف الغرامات و الصرف من فلوس الرعايه او الادويه او الورق بعد ما تعصر اهل العيان والا تأثم.
   - Database on computer + excel sheet + hard copy of admission, discharge/mortality & cumulative balance.
2. مواعيد تعقيم البلازما: الأحد - الثلاثاء - الخميس
3. كل جروب بيمسك قاعتين فقط
4. المكنة الجديدة و القديمة بتوع الغسيل
5. اجهزة الرعاية زي السونار و الايكو ... الإيكو مكانه في أوضة الـ study
6. التلاجة بمحتوياتها من الادوية زي

a)streptokinase, b)glyopressin, c)precedex d)sorbisterit وده يتم يوميا

7. مفاتيح الاوضة بتاعة study
8. Cardiometry
9. Drugs:
   - Group A: Morphine, Nalufin, Fentanyl, Katalar
   - Group B: Diprivan, Tracium, Dormicum
10. Bronchoscopes: Grey(pediatrics), Green(teenagers), Orange(adult)

لازم تتأكد ان ال Brochoscopes متعقمه مواعيد تعقيم البلازما: الأحد - الثلاثاء - الخميس

11. رسايل الزملاء
12. CVLs & Mahurkers (اطفال وكبار) بطاريات اجهزة السكر وبطاريات المناظير و اللمبات
13. Paperwork (ورقيات): تتصور تبع المستشفي و لو قالك مابتتصورش

1←اشتري رزمة ورق و إدي الراجل فلوس 2←شوف أرخص مكان بره

3- حاول تمشى امورك وتكلم الكبير

Admission sheet, mortality/discharge sheets, lab sheet, cumulative balance, Checklist:

أي حاجة ناقصة تاخد المشرفة وتطلع بدالها من المخزن وتبلغ كتابة وخليك معاها لحد ما الحاجة تكمل .

14. **Donations :**

قبل ما تبعت اى تحليل بره سواء مع الاهل او من التبرعات لازم تسأل نفسك نتيجه المعمل هيُبنى عليها عمل .

لوالعمل غير مُضرماتبعتش واعمل المطلوب وابعت تاني يوم.. لوالعمل مُضر (لازم تبعت مع الاهل او التبرعات)

ولازم تعرف الاماكن الارخص زى:
المنيل الفيروسات ب 400 فى السموم ب 360 وأحيانا فى الملك فهد ببلاش , البوتاسيوم فى المنيل ب 37 , التروبونين ب 170 و هكذا

15. ثلاجة أكياس الدم: أكياس الدم اللي فيها إما يتعلقوا أو يرجعوا بنك الدم اللى تجيبه اديه للعيان ويدخل بهيموجلوبين عالى المهم التلاجه ميبقاش فيها دم لو فيها هيحصلك مشكلة

16. بنستلم كابلات arterial، لو سمحت تركبها و تشيلها (يا تَحَسُن يا وفاة)

17. pulse oximeter حافظ عليها واعرف بتتلف ازاى

18. أي حاجة بتدخل في المونيتور بسنون، لازم تبص عليها كويس قبل ما تدخلها علشان السنون متتنيش علشان لو اتنت باظت

استلام العيانين

- Admission sheet + lactate, RBS, EF, CVP
- Progress notes
- Lab sheet (mark any abnormal labs وتتعاد فى نفس اليوم
- POCUS sheet(point of care ultrasound)
- Cumulative balance
- Problem sheet
- Cultures sheet → documented once sent.
- Drug sheet
- Fluids sheet

هام جدا :

1- لكل مجموعه اوضتين فقط مهما التمريض ألح ولو فى مشكله تعارض ده كلم الكبير فى اليوم

2-اقصى دخول لاى مجموعه هو اتنين عيانين فى اليوم لو اكتر من كده ممكن تستلم عيان مافيهوش مشاكل من مجموعة تانية.

التعامل مع التمريض

كل حد وله طريقه لازم تمسك العصايه من النص من غير ماتخسرهم بس اى عيان يحصل فيه مشكله لازم تقدم شكوى للكبير ولا هتشيل وزره

Patient Transportation

1. + خطر خاصة فى الحروق لان صعب توصيله Monitor -2+ نائب مش امتياز
   portable ventilator لو مش موجود اوانت مقلق ⟵
   Ambu test it 1st against your hand :simulate the ventilator .
   a)↑ flow to achieve FIO2 ,
   b)maintain pressure as a peep at the end of inspiration
   c)control TV باانك تدوس للاخر APL valve وقافل
   d) RR as adjusted RR on ventilator

2. Full oxygen cylinder+ لاكوز
3. Proper tube fixation + intubation box+complicated أقرب مكان ليا لو العيان
4. Emergency & sedative drugs

حاجتين تمنع النقل ومفيش عيان يخرج من الرعايه فى وجود الحادتين دول
الا لما تسأل نفسك الحاجه دى life threatening or not

a-Unstable on Maximum inotropic support not maintaining BP
مشحونه Syringe pump لازم ال+ spare

b- Hypoxic (test filure: fio2 70% PEEP 5 So2 <92)

واتأكد انه مش بي desaturate مايحزقش خالص (خصوصا عيان المخ)على الانبوبه الا لو انت تعبان

5. لو العيان مركب arterialوصلها بـ lineوانت بتنقله علشان تشوفه
pulsate +rate+distance for pressuure

6.**CT** لو العيان علىinotropes أو مقلق منه

لازم تلبس أنت أو المرافق Apron ماتسيبوش على نفسه

6. **MRI :**

⁎يكون على نفسه علشان ماحدش هينفع يدخل معاه بـ Ambu
⁎لو اضطريت في حلين ⟵1- اعمل وصلات للـ O2 cylinder و حطها برة الأوضة .
⟵2.حط وصلة الـ O2 في جهاز التخدير الـ compatible مع الـ MRI .

Contraindications of MRI: a)pullets

b)(fixator,pacemaker) may be compatible or not.

⁎يستحسن مايكونش فيه Inotropes لانه غالبا هيبقى لا يبنى عليه عمل ولو لازم اعمل توصيلات وحط ال سرنجه الكهربائيه بره الاوضه

مساءا بالرعايه

لازم حد صاحى يمر على القاعات بصفه دوريه كل نص ساعه علشان يتأكد ان ال

1- Monitors وال ventilatorsواصلهو ومش بتدى alarms

2-ان فى ممرض فى القاعه

3-ان الستايرمش مشدوده خصوصا على الاطفال الصغيره اللى امهاتهم جنبهم

ولازم كل ماتعدى تاخد قراية pulse oxymeterحتى لو بيفرك كتير .

4- من 6 لـ 8 مساءاً كل المعامل متسجلة و بتتصلح و متحدد للامتياز هيسحب تاني امتى ،

و الـ Morning duties خلصت .

5- 12 مساءاً بصة 1-trend على ورق الداخل و الخارج ،2- و العلاج متوزع و3- متاخد

و 4-ممضي عليه ،والـ 12 + 8 لو قدرت .

NB:لو القاعه قلبت او كذا admissionفى نفس الوقت او لحظة ال CPR

لازم يبقى فى حد بيأمن باقى القاعات (هام جدا جدا جدا)

❖ ساعة ال careلازم حد يكون بيراقب باقى القاعه او حد قاعد على ال central station

شويه حاجات هتسهل يومك فى الرعايه :

1- **الحضور الساعه 8 صباحا وتعمل ال checklist**
2- **ماحدش يمشى قبل 4 حتى لو المرور خلص بيقعد يظبط الحاجات مع اللى قصاده ويكتب المعامل ويرفعها**
3- **الادويه تتصرف قبل الصيدليه ماتقفل واحنا بنمر علشان لو استنيت بعد المرور مايخلص هتلاقى الصيدليه قفلت وبالتالى العيان قاعد يوم فى الرعايه من غير استفاده جديده**
4- **واحنا بنبص على العيانين اللى قافلين ترابيزه بتاخد فى ايدك انابيب المعامل والمضاد الحيوى وتديهوله وتسحب المعامل على ماالعيان يطلع الرعايه هتكون معامله طلعت هتنجز لنفسك وتخف شغل الادميشن**

5- **الساعه6 صباحا الريكوستات مكتوبه ومحطوطه على ترابيزات العيانين ماتخليش حد يقف فوق دماغك ويوترك حاول تبقى خطواتك منظمه**

Morning duties

- كل نايب وزميله اللي قصاده بياخد 3 عيانين يقفلهم ... العيان الجديد مع اللي كان نبطشي .
  - اسحب بنفسك blood gases for the most critical patients وسجلها .
    لو الـ pH أقل من 7.25 أو أكثر من 7.55بلغ المدرس المساعد أو استنى المرور وابعتها ع الجروب .
  - Adjust ventilatory settings according to blood gases.
  - In case of severe acidosis in non-ventilated patients → give $NaHCO_3$ or arrange for dialysis.

- **Labs**: fulfilled in lab sheet with documentation of lactate & FiO_2 : PF ratio &highlight abnormal labs .

- **Balance** → check the trend over last 6 hours.

- **Problems** → acute & chronic.

- **Checklist** (304-305) لازم يتعمل كل يوم الصبح بدقه شديده هتاخد وقت فى الاول بعد كده هتتعمل بسهوله

*عيانين الحروق ويتسلموا وتنزل معاهم بمونيتور كويس

*تلاجة الدم لو العيان اتأجل ياخد الدم ويدخل ب HB عالى لو اتقفشت=شكوي

*ترابيزات الجراحة المقفولة

*أي حاجة ناقصة بلغ كتابة و خد المشرفة في أيدك بنفسك

*حصر المناظير و الكابلات البايظة .

*ال crushtrolley والمشرفه معلمه عليه كل يوم

- **Fluids**: (5+5NB)
  - Route,Volume,content,line&RBS → Adjust according to labs,ABG & acute problems.
    - Check nurse sheet carefully +RBS +lines.
    - Adults: 25-30 ml/kg/day & re-assess in case of DKA, change in UOP or Na level.
    - Pediatrics: اسأل المدرس المساعد P(256)

الحاجات اللي بنبلغ بيها التمريض 9 الصبح :

- Dialysis, number of patients undergoing dialysis & patient preparation

1.virology → 300جنية في سموم → 450 جنية في الرابع

2.nephrology consultation 3. Mahurkar 4.antihyperkalemic &HCO3 for acidosis

ولو العيان كويس ومفيش حد يغسل اطلع به الملك فهد

*تتطلع الملك فهد بـ : 1←D.C 2←شفاط حيطة

3← Monitor 4← ventilator يدخل في وصلات الحيطة اللي هناك

- CXRs
- Cultures (يوم الخميس في مزرعة دم..فى الأجازات أحيانا معمل الطوارئ يكون شغال)
- لازم تتأكد ان ال Brochoscopes متعقمه مواعيد تعقيم البلازما: الأحد - الثلاثاء – الخميس وفى حد مسئول عنها ولو في مشكلة يبلغ ع الجروب ويبلغ التمريض وبعدها بساعة يقول حصل ايه.

- **Drugs**: حد مسئول عن صرفها

- **5 types of patients should be monitored every 4 hours: (Trend)**
  - **1-AKI → Urine output+ K.**
  - **2-DCL, TBI & brain tumor → Conscious level.**
  - **3-Active bleeding → Hemodynamics & hemoglobin.**
  - **4-Balance in polyurea….**
  - **5-peak in ARDS**

- لازم كل يوم تتأكد ان كابل ال **DC & portable monitor** متوصل بالكهرباء ومربوط فى المونيتور

- **الـ D.C موجود في كل اللست**

⁎**Synchronization: in narrowwQRS & V tach with pulse (QRS شرط فوق الـ)**
⁎**D.C مش تحته سلوك**
⁎ أمان ليا و للعيان
⁎**Sedation + Analgesia .**
⁎ لو في أكسجين أبعده
⁎**Paddles /Cable بيقرأ من ال**

Contents of crush trolly

1-Adrenmax (1ml) 1mg/1ml

2- Atropine (1ml) 1mg/1ml

3- levophed (4ml) 4mg/4ml

4- Lidocaine HCl 2% (50ml) 20mg/ml

5- $NaHCO_3$(50ml) 84mg/ml or (25ml)

6- Solucortef (2ml) 100mg

7- Epantuin (5ml) 250mg/5ml

8- Calcium gluconate 10ml

9-Lanoxin (1ml/ 500mic)

10-Katalar (500mg/10ml)

11-Isoptin (5mg/2ml) 2.5mg/ml

12-Amiodarone 3ml-150mg

13-Tracium (25mg/2.5ml) or (50mg/5ml)

14-Sux (100mg/2ml)or (100mg/5ml)

15-Esmerone (50mg/5ml)

16-Proprofol (diprivan) 20ml /1%(200mg/20ml)

17- Intraval 500mg

18-Dormicum (15mg/3ml)or (5mg/1ml)

19- Xylocaine (20mg/1 ml) (50ml/ 2%)

HOW TO PRESENT A CASE

*العيان في الرعاية علشان عنده Acute / Chronic problems متنساش ده، و انت مشغول في شغل الرعاية بتاع المرور .

*مع كل عيان لازم تسأل نفسك سؤالين: هو هنا ليه وبعمله ايه

♦ Name ♦ Age ♦ Gender

Medical history → e.g, DM, HTN + Analysis: duration, treatment & complications.

Eg :IHD (H/O &ECG &ECHO & وعمل PCI , CAPG or not)

Eg : Addiction (virology)

Surgical history → Mention it if relevant → course of disease له impact علي الـ

→Impact on management e.g.(ventilation)

Cause & date of hospital admission **من لحظة دخولة المستشفى لحد ما دخل الرعاية**

+ trauma survey كامل + Acute & Chronic problems

Trauma survey in traumatic cases

Mention the trauma survey in traumatic cases in terms of specialities(+ve 1st):

- **1. Neurosurgery** •**2. Cardiothoracic** •**3. General Surgery**
- **4. Vascular surgery** •**5. Plastic & maxillofacial surgery3D face للعيان اللي وشه وارم**
- **6.Urosurgery** •**7. Orthopedic** لازم تشوف الاشاعات •**8. ENT**
- **9. Ophthalmology** 5-reconsult after 48hr 4-maxillase or alphintern 1-كمادات-2-قطرة-3-مرهم

•1. Neurosurgery:

A. **Brain** : DCL with free CT brain suspect → a) post-concussion
→ b)diffuse axonal injury
→ c) Post ictal
→ d)Drugs (toxicology)
→ e)metabolic

→ consider follow up 1) CT brain after 24- 48 hrs,
2)MRI with diffusion(pacemaker ,fixator,pullets)
3) EEG(a.during attack,or b. continuous 48hrs, c.stop sedation)

NB: subclinical fits – العيان مش بيتشنج قدامي = DCL+attacks of tachycardia +hypertension

B. **Spine** : 5 items

1) do neurological assessment (motor +sensory)
2) ask about fracture stability (يتقلب و يقعد)
3)need for binder,need for fixation العمودين الحديد يتحطوا على مستوى الكسر
4)need imaging(MRI for soft tissue or CT for bone)
5) ± Solumedrol (1st 8 hrs only).

1. The patient should be on a hard surface wearing a neck collar.
2. Cervical spine should be at the same level with the head & shoulder.

إزاي تنقل العيان؟ هدفك إن الـ shoulders, head & neck يتنقلوا one unit فيا إما:

1- على hard board أو
2- إيديك الاثنين تحت اكتافه زي الجاروف وراسه مسنودة بالـ forearms عشان تضمن إن راسه في نفس مستوى اكتافه فترفعه one unit الا لو عربيه بتتحرك.

Neck collar (prevent flexion & extension)

☞**Types** a)Philadelphia(in tracheostomy) b)Hard c)Sponge

C. Limbs :

1) power (distal or proximal) 2) sensory 3) mono , para , quadriplegia

●2. **Cardiothoracic:**

- **Chest** :a)ribs→ In case of massive trauma or fracture ribs or flail chest → ensure adequate pain control with epidural analgesia or morphine infusion or nalufin infusion + p(99) بالتفصيل
  b)Pleura
- **Heart : cardiac tamponade see pecks triad p(122)**

●3. **General Surgery**: ●4. **Vascular surgery**

●5. **Plastic & maxillofacial surgery.(3D In face trauma)** 6.**Urosurgry**

●7. **Orthopedic** لازم تشوف الاشاعات

الشده : 1)ماتبقاش مدلدله على الارض 2) وتكون فى كيسين علشان الرمل مايبهدلش الارض

3) neutral : not internally or externally rotated 4)axis: البلاستكة علي كعب العيان

●8. **ENT**

●9. **Ophthalmology**.a. cold fomentation b.toprex c. consultation daily d.maxillase & alphintern.

- فى حالة وجود اعطال فى الاجهزه او محتاج سرعه لان المريض مش هيستحمل← full trauma survey with CT

Surgical intervention if present ***بالتفصيل لازم تبقى عارف الجراح عمل ايه:***

تستلم ورقه (trauma survey) او ورقتين(تخدير وجراحه)او 3 ورقات (تخدير وجراحه و trauma survey)

Cause of ICU admission and most probably …. &Date+ Day

☜ قول القصة في صورة حكيوة لطيفة chronological ... مثلاً عيان اتحجز في المستشفى
بـ acute abdomen وعمل exploration فطلع perforated DU ... حطوا omental patch ...
في العملية ضغطه وقع واتحط على ليفو فطلعوه الرعاية .

☞ Cause of hospital admission: Acute abdomen, exploration revealed perforated DU for which omental patch was done ... Cause of ICU admission: hemodynamic instability.

✋ **If post-arrest 6:** Ask about a)cause &b) duration of arrest &c) conscious level after ROSC d)fullfill targets : 1-MAP >65 2- normal CO2 ,3-SO2 >92 on minimal fio2,4- avoid hypoglycemia or hyper , 5-avoid glucose containing solutions ولو ممشيها وقفها علشان هتنسى.
6-avoid hyper thermia(32-36) 7-diagnosis & ttt of seizure. 8-ECHO

Full picture on admission →→ **Sequence of events in each system till now**

قول picture on admission وبعد كده امسك كل system في العيان حصل فيه إيه ودلوقتي وضعه إيه وبعدين ادخل ع الـ system اللي بعده .

هامIf the cause of admission post operative monitoring you should know what will you follow
eg . stab heart you should follow up Bleeding and tamponade
eg. IHD+perforated DU →a)sepsis
b)IHD (hemodynamics, ECG, cardiac enz)

1) CNS (5items + DD ..most propablyP:191)

a➢ GCS: ★ If fully conscious & ventilated →1- mention medications used for sedation (name of the drug & dose) 2-Target RASS score: -1 to -3 → see later(49).

★ If DCL or confused: mention the GCS in details then comment on the following items

\+ DD of DCL (most propably ……) :

b➢ Pupils(1.Round 2.Regular 3.Reactive (RRR) & 4.equality)

c➢signs of lateralization (proximal , distal , mono or para or dynamic)

} intra cranial

عيان مربوط ناحية واحدة أو بيخبط ب ناحية واحدة أو باصص عكس ال vent
.

d➢ **CT brain** → In case of DCL with free CT brain → repeat after 24- 48 hrsor any drop in conscious level

NB.*Bone window *Brain window see P(302-304)

e➢ Others: e.g toxicology, EEG & MRI with diffusion in case of 1) convulsions or2) DCL not explained by CT brain or 3) unexplained tachycardia with DCL (may be sub-

convulsive fits),if EEG free during attack→A)sympathatic over stimulation and consider Inderal &B) addiction for toxicological screen C)metabolic D)diffuse axonal injury .   ct brain free كله هيتقال حتى لو ال

☞ If the patient is still under GA on admission → don't start sedation until assessment of   conscious level (never say under GA تقول بعد ما فاق عامل ازاى).

Glasgow coma scale					
Eye opening		**Verbal response**		**Motor response**	
Spontaneous	4	Oriented to time, place & persons	5	Obeying	6
In response to speech	3	Confused, sentences	4	Localizing	5
In response to pain	2	Words	3	Flexion withdrawal	4
None	1	Sounds	2	Flexion	3
		None	1	Extension	2
				None	1

Differential diagnosis of DCL

a) Intra-cranial:

★ **Trauma:** hemorrhage, contusion, compound depressed fracture & diffuse axonal injury(Normal ct & causes free (by exclusion) → then MRI ḗ diffusion &EEG).

★ **Infections:** brain abscess, meningitis, encephalitis (neck rigidity & fever → CSF chemistry, cytology & culture سرنجتين + MRI with contrast).
RBS should be assessed at time of CSF sampling بالابره صفرا (very thick)

★ **Tumor:** brain tumor.

★ **Others:** (stroke,subclinical fits) esp un explained post operative(neurosurgery)→with free CT brain post operative , hypertensive encephalopathy & epilepsy.

NB:The most common causes of postoperative DCL in neurosurgery are:

sbclinical fits or stroke (mostly normal CT)

b) Extra-cranial:

★ **Drugs:** addiction (trauma+DCL+CT free →toxocolgical Screening (urine& blood) & iatrogenic   (e.g,dormicum).P(201)

★ **Blood gases abnormalities:** severe acidosis or alkalosis, hypercapnea, hypoxia, hypoglycemia & electrolyte disturbance.

★ **System failure:** hepatic encephalopathy, uremic encephalopathy, Addisonian crisis & myxedema coma.

★ **Severe sepsis.**

هام جدا ☞ *Follow up conscious level every 4 hours & perform immediate CT after 24 hr or in case of drop of conscious level.if the patient has brain contusion .*

Paralysis:

a) Hemiplegia (brain or cervical spine) → CT or MRI

b) paraplegia (1- lumbar mainly ,2- rarely brain or cervical)3-vascular من اسبابها

- proximal or distal
- ascending or descending
- diurnal

} consider MS / Myasthenia for investigation:
a)nerve conduction velocity
b)EMG eg. guillian barre

c) monoplegia (brain /brachial plexus/bone/muscles/vascular)

if in upeer limb →do MRI brachial plexus

2) CVS (4 items+DD of shock….most propably P:114)

- **ABP & HR, On inotropes or not** ?? If yes →

  (type , dose , fixed concentration /50ml , in separate line)

  P(238)

Mention the DD of shock (see shock)P(108) and most probably ………..

- **ECG 7 items:** قبل ما تحكم على رسم القلب لازم تتأكد إنه معمول صح

  1.name & date ,time

  2. Voltage: 10 mm/mv (2 large squares in limbs &chest 5ممكن ECG نصه 10 ونصه).

  3. Speed: 25 mm/sec (sec = 5 large squares).

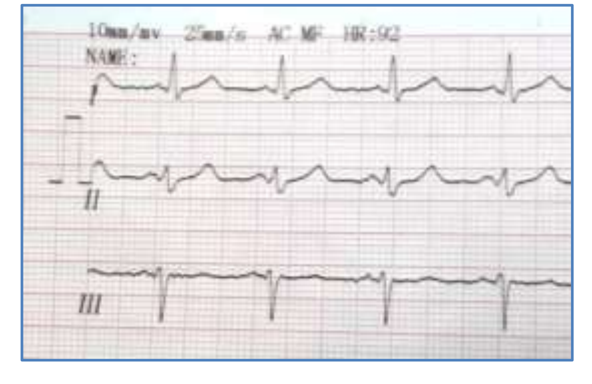
  4. aVR → inverted waves (QRS لتحت.)

  هام جدا5. Compare with previous ones to detect dynamic changes.

  من الاحسان انك تدبسهم في ورقه واحده علشان تسهل المقارنه

  6. Topography, (reflex وهام).

  7. Assess: Rate, Rhythm & Waves (one of most important waves Pathological Q) P (257)



Topography:=T,ST,Qتبص على

- Septal → V1,V2
- Anterior → V3,V4
- Antero-septal → V1,V2,V3,V4
- هام Lateral → V5, V6, I, aVL
- Antero-lateral → V3,V4,V5,V6, I,aVL
- Inferior → II, III, aVF.



- **Echo 4 items:**

  1- شمال → Left ventricle contractility (EF)+ diastolic dysfunction

  2-يمين → Right ventricle dimensions (dilated or not).

  3-بره → Pericardium (there is effusion or not)

  4- جوه → Fluid status(IVC & kissing sign in short axis).p()

- **Cardiac enzymes:** Only in 1- shocked cases
  2- IHD
  3- burn
  4- reperfusion ...

If cardiogenic shock is suspected by Echo or ECG changes → repeat after 2 hrs then every 8hrs. لازم تعملها بنفسك

- NB. Capnogram : is an indicator of shock with
  un explained ↓ → embolism or hypotension
- NB .Pulse oximeter draw waves with max size + adequate UOP =مينفعش تقول مفيش ضغط
  If Without wave = irrelevant value *ما تخدش قراية saturation من غير waveمرسومة
  *لازم تبص على Chest expansion

3) Chest (6 items+DD…most propably p27)

1➢ **Auscultation**.

2➢ **Imaging**: a)CXR (see below 6 items) ±b) CT chest(mediastinal window &lung window) or c) lung ultrasound.

3➢ **On room air, oxygen therapy(flow & FIO2) or ventilated**: calculate the PF ratio (PO_2/FiO_2) (in fraction)as anumber or range from the monitor ,If on oxygen therapy → Venturi mask or Nasal cannula (flow ?) P(101).

If ventilated → Ventilation parameters ??

4➢ **ABG** 1-اتسحبت الساعة كام -2اكتب اسم العيان و

(3-write the ventilator parameters on it).

PF ratio should be calculated.

Should be arterial in hypoxic patients. If not hypoxic → from the CVL متشكش العيان

5±➢ **ABG after re-adjustment of ventilator parameters. لو رقم 4 طلعت وحشه**

6±➢ **Differential diagnosis of hypoxia and most probably …….**

Chest x-ray 8 items P(293-301)

1. name , date ,clinical تربطها

2.CVL: a)Site (internal / subclavian)(بتتأكد منها إن الصورة دي بتاعة العيان لان ممكن الاسم يكوه غلط)

b) tip position:1-RT 2-2^{nd} rib anteriorly(SVC & rt atrium) usually at level of trachea bifurcation ,normal variant, Lt side in 15% of population .

2. Lung borders: →Apical part →Costophrenic →Total lung

a)If bronchovascular markings extend to lateral thoracic wall: no pneumothorax

b)If lung border is seen: pneumothorax is present(total lung border , apical ,costophrenic).

c)CXR may miss anterior pneumothorax (no border)

(1- diminished air entry &2- flat copula of diaphragm) → If suspicious:3- CT chest 4-U/S.

3. Copula: If flattened suspect pneumothorax(CT , US , سماعه).

4. Gastric air bubbles: If distended → ryle malfunction (obstructed or not in place).

5. Trachea: Central or not ,provided the patient is centralized(clavicle) .

6. Routine: Cardiothoracic ratio, pneumonic patches & costophrenic angles.

7. صور حضرتك الشخصية افصلها عن صور الاشعات علشان ماتتبعتش بالغلط علي الجروب

+جروب للرعاية عليه كل الأشعات بس .

☞ **When to request CXR:**

1. New admission except pt for1) observational , or/and 2) clear chest e no central line
2. Procedures: after a) chest tube insertion or removal b) CVL insertion c) tracheostomy d) intubation. E)bronchoscope
3. New event affecting oxygenation or ventilation.
4. Follow up: Patients with chest problems as pneumonia & pneumothorax. Ventilated patients every 3 days.

☞ In pregnant patient → lung ultrasound is an alternative to chest x-ray.

or wear a shield(على بطنها)او في الاشعة بتاعتها او اشعة للعيان اللي جنبها تطلع بره الاوضه لو امكن الحامل ما تتصورش ولا حد يتصور جنبها.

CT chest → P(293-301)**1*** **mediastinal window (white patches& degree) differentiate between1-effusion(dark) 2-collapse(no air bronchogram) 3-consolidation (air bronchogram) 4-thoracic cage 5-CVP 6- Aorta:in comparison to vertebrae if larger (aneurysm or dissecting)**

2*lung window

→ Normal lung doesn't appear in mediastinal window (black).

1.Name ,date ,CVL

2.ETT or tracheostomy site (endobronchial , endotracheal ,esophageal or out of larynx) Mid way between larynx & carina .

3. Main air column.to detect distal obstruction لون رمادي جوه السواد & correlate with ventilatory numerics

4. Gastric air bubbles .

5-Routine : اي حاجة تظهر لازم نبص تحتها و فوفيها

1) Pneumothorax &pneumomediastinum.

2) Effusion (serous ,blood ,pus,..).

3) white patches: Central →congestion (cardic)

Peripheral →COVID

Pyramid →infection / Embolism

Diffuse →Sepsis / ARDS / renal overload

collapse :air bronchogram fungal

malignancy (if the mass conclusive and not responding to antibiotics →for biopsy)

4) Chest tube(position ,entry point)

5) Cardiothoracic ratio

6- diaphragmatic hernia (in axial cuts)

Differential diagnosis of hypoxia (Most propably)

1. Chest auscultation:

★ Diminished unilateral: collapse - endobronchial tube - دم - ميه - هواء

★ Diminished bilateral: obstructed tube, bronchospasm or pulmonary edema.

2. Imaging:

a)CXR or b)CT chest:

may detect pneumonia, pneumothorax, ARDS or endobronchial tube.

c)Lung ultrasound: may detect دم - ميه - هوا,

congestion (B ines & cumulative balance)or consolidation.

3. Echo:

a) Right side: dilated in case of pulmonary embolism.

b) Left side: 1*poor contractility is suggestive of heart failure & 2*valves pulmonary edema 3*diastolic dysfunction.

4. Numerics of ventilator:

♦ Check the peak airway pressure, plateau pressure & the tidal volume.

- High peak with high plateau indicates decreased lung compliance.
- High peak with normal plateau indicates obstruction (ETT or major airways).

Peak pressure: depends on major airway resistance (ETT, trachea & bronchi).

Plateau: depends on lung compliance.

➢ In case of pleural effusion: insert a chest tube → drain 500ml/6hr (to avoid sudden lung expansion & negative pressure pulmonary edema) & give lasix.

➢If you don't find areason , think about predisposing factor (revised Geneva criteria) of pulmonary embolism (minute)→ Do D-Dimer [Is a good –ve test ,+ve in many cases as sepsis , trauma ,…] and follow the algorithm p(141) esp if mild hypoxia and tachypnea

If the complaint persists , Think about cardiac or pulmonary cause ,and may be psychological or interstitial lung disease after excluding any organic cause هام .

Management of hypoxia ARDS احيانا زى

ARDS +P(94)

4)GIT +RBS اكتبه فى ورق المحاليل يتقاس كل اد ايه)

- لازم تحط رايل فى اي عيان في بقه أنبوبة او any abdominal surgery و اتخلعت تركب الا لو هتعدى على مكان الجراحه
- في عيانين ماتوا بسبب ryle obstruction ،أى ryle for drainage مش بتجيب سلكها.
- **enteral feeding** :Oral or ryle feeding? If no ryle or no ryle feeding mention why وبتعمل ايه عشان تشتغل?

- **Ryle**:**insertion** **see p269**

***لو العيان داخل بيها اتأكد انها فى مكانها**

1● Don't insert it orally in non-intubated patient as it may lead to regurgitation & aspiration.

2 ● **Function** :

a)If for feeding → do ryle test. Flush with 10cm water after each feed to avoid fermentation of food inside the ryle which may lead to gastritis.

b) If for drainage → 1)consult when to start feeding &2) flush to determine if obstructed **لومش جايبه**.

Check gastric air bubbles in CXR or CT or US: If distended → ryle malfunction a)obstructed(**بهوا** flush **اعمل**) **or b)**not in place).

● In case of persistent vomiting → 1)stop oral/ryle medications
2) shift to IV alternatives
3) give prokinetics
4) normalize electrolytes
5) ambulant.

(after all of this for several days), exclusion of mechanical cause with x ray (air fluid level) or CT e oral &IV contrast unless renal (oral only) if no mechanical obstruction doupper GIT is mandatory

- **Feeding: if there is abdominal distension in pediatrics consider simethicone In adult eucarbon,dysflatidyl.**

● Start enteral feeding as soon as possible unless contraindicated:
1)(paralytic ileus) .
2) surgery: a) Small intestine → 3 days …b) Large intestine→ 5 days ..
c)DU → 7 days.
3) high dose of inotropes not maintaining BP

بره مصر بيبدأوا قبل كده لكن ده أقصى معاد نتأخر فيه .. والأدوية المهمة بتتاخد بشوية ماية صغيرين حتى في الايام الاولى .

لو الجراح رفض بعد المدة:

a) CT with oral & IV contrast
b) abdominal USيستحسن عند د.مها حسب الله
c).(methelene blue يشرب حاجه ملونه وشوفها فى الدرنقه (فراوله او

● Never use intestinal sounds to start enteral feeding because 50% of patients with inaudible intestinal sounds have normal peristalsis.

➢ **Care of wound**(بنغير عليه احنا 3 مرات مانستناش الجراحه):
● No burst abdomen. ● No purulent discharge on squeezing.

➢ **Care of stoma**: لازم تبص عليها
● Pink (viable) & everted (not retracted) وردة حمراء مش سوده مفتحة لبره because if retracted may lead to peritonitis or necrotizing fasciaitis).
*Passing stool or bleeding= viable
● Short bowel less than 2 meters:
لازم تعرف على بعد اد ايه من DJ وفاضل اد ايه من ال iliocecal علشان يبدأ TPN بعد 7 ايام من الصيام وبعد كده هيعمل intestinal transplantation ولا anastomosis

NB: Length of intestine :
Duodenum 25-30 cm & jejunem 160-200cm & ilium 3.5 m
Cecum 6-7 cm & ascending colon 20cm & transverse colon 45cm
descending colon 30 cm & sigmoid 40 cm & rectum 12 cm

● Output: In case of high output fistula(small intestine) → 1.High fluid loss & 2.elecrolytes 3.HCO3 → replace according to the patient حسب العيان
1-volume and 2-electrolyte 3- HCO3.
- GIT :5-6 L / DAY.
- DJ →ileocecal :5-6 m.

● Evacuation/ 4 hrs to avoid soiling (skin maseration)=zinc oxide+ طبطب على العيان+خلات رصاص
● Rubber flansha لو التانيه لزقها بيفك واسعى انهم يقفلوها بدرى
● لو في abdominal incision والعيان بقى ambulant هتطلب من أهله:
1) 4 أحزمة بطن (Abdominal binder) حزام لجرح البطن to prevent burst abdomen وحزام لـ stoma فيه فتحة ليها ... وحزامين احتياطي عشان لو الموجودين احتاجوا يتغسلوا .
2) لو مفيش stoma يبقى حزامين فقط ... الحزام عشان يشيل بطنه من تحت مش بيدفي صدره . في المرور بيبصوا فيها
● لو ventilated والـ peak عالي ← الحزام ممكن يكون السبب ← شيله .

➢ **Drains**:
● In site. ● Daily output.
● Remove if not needed → كلم الجراحة وافرك إنها تتشال لو بدأ أكل ومش بتجيب

5)Back & Lower limbs:
● Bed sores تصورها
a) site, b) degree c)management (medical & surgical).
d) prevention (جدول تقليب تمضي عليه بنفسك)
● Edema ● Capillary refill.مهم

6)labs. Any abnoramal labs :

a) mark it
b) follow up the trend
c) correct and repeat it in the same day
d) اسأل نفسك انا والادويه السبب ولا لاء

اى عيان داخل عمليات لازم تظبط الـ

1)Hb > 10 2) INR<1.4 3)Albumin near normal
4) platelets 50000 or 100000 in brain & spine surgery.
5)Consent 6) لجنة ثلاثية 7)Device eg tracheostomy 8)swab 9)صور جرحه
10) Oral feeding & anyi coagulation تبليغ تمريض الرعاية يوقف
11)تحديد صيام 12) تقلب محاليل ، 13) تبليغ لستة جراحة و تخدير
14) حجز دم و بلازما 15) Stop anticoagulation 16)مونيتور وبطاطين
17) line مناسب ومتجرب ومتثبت كويس
18) تشفيط كويس ولو محتاج تغير الانبوبه غيرها 19)الرايل فى عمليات البطن تركب قبل العملية و يدخل بيها

Thrombocytopenia: (Inv.+ others) D.D في ورقة المعامل لو ال platelets قليلة← اعمل

Hemolytic uremic syndrome (HUS)	**Thrombotic thrombocytopenic purpura (TTP)**	**Others**: 1)idiopathic 2) DIC(Fibrinogen,Fibrin degeneration product) 3) Sepsis (lactate) 4)Liver cirrhosis من اول قرايه شك (enzymes,bilirubin.INR) 5) HIT >D4 6) Zyvox (after 2 weeks) & Tazocin &targocid هام &vanco(rare)
1)Neurological manifestations 2)Renal impairment 3)Thrombocytopenia	1)Hypercoagulable state (DVT, Stroke) 2)Thrombocytopenia	
Treatment: Plasmapharesis		Idiopathic : pulse steroid , IVIG
Investigations: LDH(HUS&TTP)[blood film ,slide بيطلبوا علي](schizocytes) & Coomb's test(HUS) ± bone marrow biopsy&AdamTS13 (TTP)		

Don't forget :الزنقة

- Anemia → do iron profile +occult blood +cause (consumption-bleeding-sampling-malignancy – others),
- If renal → heparin or thrombex
- Renal + Thrombocytopenia →Thrombex
- C.I→don't give
- Thrombocytopenia >50 000 ,unless M.I >30 000 →Thrombex / arxtra,clexan & follow up

7)Balance يتور في دماغي 5:1. Follow up the trend over every 6 hours & 2.the cumulative balance in last days ازاى تطلعه 3.negative or positive.(P46) 4. Nutrition 5+5 NB تكتبله ايه(P44) 5-غالبا العيان بيخرج اد مابيدخل

8)Fever, tlc, crp, cultures(تتسجل يوم ما تتبعت), Procalcitonin & dose of inotropes p 180.

9)care of chronic devices:

Such as tracheostomy tube p(57), chest tube p(60), urinary catheter p(64), CVLp(62) & surgical drain p(31).

Care in the form of:a) duration, b)signs of infection, c)disinfection,

d)well-functioning or not? e)needed or not? (لكل واحد صفحته

☞ Maximum duration for CVL:a) 2 weeks ... b)10 days in patients with liver or renal transplantation. c)suspect if fever of unknown origin وتشيلها] ☞ Maximum duration for urinary catheters: Foley: 3 weeks ... Silicone: 1.5 - 3 months.

10)Treatment → قاعد ليه وبنعمله إيه **(8+12)**

(a) بتبص على ورق العلاج كل يوم صبح وليل وتتأكد إن كل الأدوية :

1- موجوده 2- وبتتاخد وممضى عليه

3- ورق العلاج يكون الادويه فيه مترتبه systematic والصفح مترقمه: (cvs , resp,….)

4--مفرودة ومش عليه بقع

(b) الأدوية كلها متوزعة صح وأدوية الضغط في مواعيد مختلفة وبعض الآدوية بتقف حسب المعامل والعلامات الحيوية و بناءا عليه بيتم وضع تحذيرات بجانب الادويه

e.g, - Aspocid or antiplatlets: Hold if platelet count is < 50,000
- Anticoagulant: Hold if INR is > 2or plt < 50000 except in MI 30000
- Antihypertensive drugs: Hold if BP < 140/90

(c) In AKI → document creatinine clearance(على كل ورقة علاج) dialy.

&stability of the drugs(جوه و بره التلاجة).

(d) In pediatrics → document patient weightعلى كل ورقه & write the dose in ml not in mg if liquid, if powder لازم تقول للتمريض 1-الجرعة2-التركيز3-هيتحل ازاى (برغاوي ولالأ) 4- على ايه 5-هيدي منه اد ايه واللي فاضل يترمي ولا يتشال و تكتب الجرعة mg/kg توزعها على مدار اليوم.

and stability of the drugبراها ولا في التلاجة (especially in renal and pediatric علشان بيتبقى شويه فى السرنجه عشان تعرف هيترمي ولا لأ

(ولازم تتأكد بنفسك ان اللي باقي في الثلاجة ومكتوب عليه ده أد ايه volume& concentrationفاضل كام)

(e) Ask daily about oral drugs if a) allowed to be given or not and

b) crushed in ryle or not (P271) كل الـ extended release مينفعش يتاخد في الرايل.

c) if poor intake or high caloric requirement add supplements

- لو عيان بطن بتسال الجراح ابدا امتى short bowel or notوفرواعا

- لو عيان مش بطن بتسال نفسك (NPO or NOT)

f) take care if pregnant search for teratogenicity or morbid obese to calculate BMI

g)Drugs (foam ماتترجش وماتعملش): eg , actemra ,colistin,targocid ,streptokinase ACTS

h) Dilution : saline or glucose eg : cancidas, invanz, teinam , epanutin →CITE saline not in glucose, cordarone →glucose not saline

1. **ABC**:

ABC+satisfactory blood gases(acc to situation eg in↑ ICT co2 30-35 , in aneurysm normal co2):
A & B=adequate oxygenation and ventillation on ventilatory setting p (67) or oxygen device p(101)+DD of hypoxia p (30)→ to avoid ventilation in special cases as COPD & cardiogenic pulmonary edema(CPAP mask) , pneumothorax and effusion (chest tube insertion) or fracture ribs (pain management first)and others and adjustment of the ventilatory settings as TV &PEEP
if trauma= management of cervical spine and pneumothorax
C = (volume , Blood Pressure &Perfusion &surgical control)+ DD of shock p (114)→ to determine the type of inotropes and fluid management
if trauma management of D& E& F

يعني العيان يكون ماسك ضغط و ABG & saturation خلال نص ساعة ...
يا يكون وصل maximum maximum glypressin± (المحاليل بتتاخد بالسرنجه فى خلال 4-5دقايق)

1 ♦ In non-ventilated patients: ensure proper oxygenation & ventilation with adequate BP & accepted blood gases+ DD of hypoxia +management of reversible causes&vent setting .

خلال ربع ساعة يا قاري ضغط كويس يا Max. Max.

2 ♦ If indicated for ventilation with sufficient time (not pre-arrest),

e.g; severe metabolic acidosis causing marked tachypnea:

- Obtain adequate IV access & ensure adequate BP before intubation by vasopressors, fluid resuscitation or both simultanously(حسب العيان)+ DD of shock.
- Increase levophed dose rapidly (not gradually) till adequate BP is obtained ±arterial line.
- If CVL is inserted(without extension lines) زق نص سم الاول علشان تضمن انه وصل ,
- الأسرعIf no CVL inserted yet, don't waste time(unless difficult canulation) in inserting one. Instead, levophed can be

o

Infused on a) external jagular or b) peripherally up to 2 hours →

بس لو فى peripheral cannula حط عليه ستوب كوك ومحلول عشان يمشيه ويوديه القلب

- Take care of full stomach (see tube insertion p76) then intubate.

*لو prearrest كله بيتعمل مع بعضه بمعنى هتحط انبوبه على طول وحد بيدى اتروبين او ادرينالين على حسب الوضع

3 ♦ If already ventilated (or after intubation): P67

- Confirm tube position & ensure satisfactory ventilation settings according to oxygen saturation & blood gases, e.g; hyperventilate in case of metabolic acidosis

& set the FiO_2 at a value that achieves $SO_2 > 90\%$ & recheck the blood gases.

4♦ In case of shock: DD to determine type of inotropes &fluid managment +TTTof the cause

2. Specific treatment = acute problems: refer to protocol p(7-8).

ممكن فى كل system يكون فى اكتر من حاجه

3. The 4 Anti:

♦ Antibiotics →1- Initiation according to a)site of infection p(178) b)stable or not p(176)

c) سرعة السقوط d)±sidde effects of drugs كفتين ميزان

&Response ,2- modulate it فى مزرعه ولا لاء P(180)

surgical source+chronic devices ← لو متحسنش بعد 48 ساعة

- **مع كل تغيير ورق العلاج لازم تكتب تاريخ بدء المضاد الحيوي مش تاريخ تغيير الورق**

Consider viral infection (in pneumonia cases)**, TB or infective endocarditis**.

لكن خلي بالك Every antibiotic has stability →بره وجوه التلاجة

خاصة فى الاطفال وال renal حطه بنفسك فى التلاجه بعد مايتحل وبص عليها و اتأكد انه طالع من التلاجه قبل كل جرعه

♦ Antacid: Zantac 50 mg amp/ 8 hrs (has renal adjustmen

or Losec 40 mg vial /24 hr

♦ Analgesic & Antipyretic:

Adults: perfalgan 1 gm vial/ 6 hrs or PRN.

Pediatrics: Paracetamol 1-perfalganIV: 15 mg/kg/dose (1.5 ml/kg/dose) →

write the dose in ml not in mg to avoid misunderstanding

& paracetamol toxicity,(2-suppository أو-3 أفضل شراب).

NSAIDs: 0.5-2 mg/kg/day ... خطر في الوزن الصغير& contraindicated in infants < 1 year old.

*خد بالك الـ suppository

:eg: glycerin&dolphin 12.5 mg & 25mg

Anticoagulant

Category	Generic name	Trade name	Route of administeration	Antidote
Factor xa inhibitor	Apixaban	Eliquis oral	Oral	Andexxa مش موجود في مصر
	Rivaroxaban	Xarelto oral	Oral	
	Fondaparinux	Arixtra SC.	Parenteral	
LMWH	Dalteparin	Fragmin	Parenteral SC	Protamine sulfate
	Enoxaparin	Clexane, levenox SC.		
	Nadroparin			
	Tinzaparin	Innohep		
UFH (antithrombin III actvator)	Heparin	Heparin	Parenteral Iv ..therapeutic Sc...prophylactic	Protamine sulfate
Vit k antagonist	Warfarin	Marivan Coumadin	Oral	Vit k
Others (anticoagulant)	Lepirudin	Thrombex	Parenteral SC	
Antiplatelets	Aspirin	Aspocid	Oral	
	Clopidegrel	Clopidegrel Plavix Clopex		
	Ticagrelor	Brilique 1st choice in IHD بديل ال Plavix		
	Tirofiban	Aggrestat	Parenteral	

- V.imp :switching from parentral to enteral :when preparing the patient for discharge.
- N.B:if prophylactic (heparin[شكتين او تلاتة]
  or clexan[شكة واحدة in1- thigh or 2-abdomen] no difference)
  clexan is better than heparin→ لانه شكه واحده
  disadvantage of clexan : غالى وبيلسع

♦ Anticoagulant: start as soon as possible unless contraindicated,
NB. ***the alternative is intermittent leg compression (pneumatic cuff:except in DVT & ischemia) or filter if DVT .***

Indication of filter ***1-Showering on therapeutic anticoagulation***
2-Anticoagulation is CI
3-Urgent surgery= must
4-Prophylactic(not DVT) long bones or

NB. In case of major trauma & long bone fracture with CI to anticoagulants : IVC filter even with absence of DVT (prophylactic filter)

NB + عناوين(prophylactic & Therapeutic)

NB LMWH better than clexan

Once ذُكر prophylactic anti-coagulation ➩Enteral or parentral + 4 items

- **Prophylactic anticoagulation** : 4 points
  - ***1.Indications*** :
    a)All critically ill patients with extended periods of immobilization ,mechanical ventilation and vascular injury or surgery unless CI.
    b)Major trauma patients c)pediatrics NO unless special score.
  - ***2. Contraindication:*** ***the alternative is intermittent leg compression (pneumatic cuff)Except L.L ischemia or DVT***
    a▪ Active bleeding from the wound or any body orifice
    b▪ Intracranial hemorrhage or brain contusion →
    1)start on day 4(prophylactic) after neurosurgiacal consultation, CT after 24-48 hr
    2) if therapeutic after 4 weeks.
    c▪ Suspected bleeding by surgeons.
    d▪ Platelets < 50,000
    e▪ INR > 2
  - ***3. take in consideration*** :
    1. ***Weight*** ***2.platelets***
    3.Contraindication ***4. CrCl***

    NB:No ptt as no monitor ,No stability as all SC
- If renal → heparin or thrombex
- Renal + Thrombocytopenia →Thrombex
- C.I→don't give
- Thrombocytopenia >50 000 ,unless M.I >30 000 →Thrombex / arxtra,(clexan or LMWH follow up)

4. Doses ***(enteral &parentral)***

A. Parenteral : ⁎ clexane ⁎Heparin ⁎Arixtra ⁎Thrombex

☞ Routine → LMWH: Clexane (enoxaparin) 40 mg SC /24 hours at 6 pm.
عشان ممكن يدخل عمليات تاني يوم بعد المرور أو قرارات جوهرية.

☞ In case of BMI > 40 or total body weight > 100kg unless pregnant: total body weight > 90kg : Clexane 40 mg SC /12 hours.

☞ In case of BMI > 50 : Clexane 60 mg SC /12 hours.

☞ In case of renal impairment (crcl<30): Heparin 5000 U SC 8/ or 12 hours or thrombex.

☞ In case of renal impairment + BMI > 40 : Heparin 7,500 U SC /8 hrs or /12hrs.

☞ In case of thrombocytopenia HIT:
switch to Arixtra 2.5 mg/24hr SC(fondaparinux: anti-factor X)
(limited in renal impairment
or Thrombex [Has renal adjustment] (hirudin: anti-factor II) & consider possible etiology (الجدول) .

☞ Suspect HIT after day 4 or earlier with history of previous exposure to heparin

Thrombex dose adjustment according to creatinine clearance

☞ Thrombex ampoule: 1 ml containing 15 mg

Thromex prophylactic only not therapeutic.

> 60	30-60	< 30
15 mg/12 hrs	5 mg/12 hrs الأمبول يتسحب على سرنجة انسولين(100وحده) وندي العيان 33 شرطة 1/3 أمبول	1.6 mg/12 hrs الأمبول يتسحب على سرنجة انسولين وندي العيان 11 شرطة ثُلث الثُلث

☞ Arixtra: Prophylactic dose: 2.5mg (therapeutic dose in MI) Cr cl 20-50(1.5mg SC)

B. ***Enteral*** :

☞ Xarelto :10mg /24 hrs .

☞ Eliquis :2.5 mg /12 hrs

→ **Bed ridden patients**

Unless P39

☞ Elastic stocking has no role

Anticoagulants and regional anesthesia

Prophylaxsis	When to stop **before** regional	When to start **after** regional
Clexane	12 hrs if prophylactic, 24 hrs if therapeutic	2 hours
Heparin	4 hours	1 hour
Arixtra	36 hours	6 hour
Thrombex	10 hours	2 hour
Marivan	3-5 days +INR <1.5	12-24 hour
Plavix,berlique	5-7 days	Wait risk of bleeding
Xalerto,eliquis	48 hrs	6 hour
Dabigatran	5-6 days	6 hours
Aspocid	ما بيقفش	6 hour
Thrombolytic	48hrs & normalize ptt	10 days

Theapeutic anticoagulation : 4points

1.Indication :

1)CNS:

a) venous stroke(not arterial) b) superior sagittal sinus thrombosis
c)cavernous sinus thrombosis .

2)CVS:

a)moderate to severe mitral stenosis in embolic event
with sinus rhythm (for life)

b)MI for 8 days or revascularizaion (PCI Stent ,CABG ,streptokinase)ايهما اقرب

c) AF p(148)

d)mural thrombus

e) Prothetic Valve

3)Chest :

Pulmonary embolism

4) GIT:

MVO , start therapeutic anti-coagulation on day zero علي الترولي
(heparin & LMWH) & consider a second look in case of
patient deterioration or gangrenous stoma.

5) vascular:

a)DVT b)Ischemic limb c) minor anastomosis

NB After thrombolytic therapy when pttdecrease below 2 folds.

2.Contraindication: ***Temporary put intermittent leg compression (pneumatic cuff)Except L.L ischemia or DVT***

a▪ Active bleeding from the wound or any body orifice

b▪ Intracranial hemorrhage or brain contusion →

1)start on day 4(prophylactic) after neurosurgiacal consultation,
CT after 24-48 hr

2) if therapeutic after 4 weeks.

c▪ Suspected bleeding by surgeons.

d▪ Platelets < 50,000

e▪ INR >2

f.Stroke 3-6 12 day.. p206

g.ICHge 2-6wks

	1)Malignancy & 2) pregnancy	1)Prosthetic valve & 2)AF e e moderate to severe MS 3)Epanotin & tegretol 4)Mural thrombosis 5)berlique	Others(other indications.of anticoagulation
Heparin & LMWH	✓	✓	✓
Marivan	✗	✓	✓
NOAC(prophylactic or therapeutic)	✗	✗	✓

3.Take in consideration : Choise of therapeutic anticoagulation ????6أسئلة

1.Weight ***2. platelets***

3.contraindication ***4. CrCl***

5. availability of PTT or no ***6. stable or not :according to hemodynamics***

4.Dose of therapeutic anticoagulation :

a) Enteral **:** *⁎Marivan* *⁎NOAC(Eliquis & Xarelto)*

b) Parenteral_: ⁎ clexane ⁎Heparin ⁎Arixtra *NO therapeutic Thromex

- Heparin:(provided PTT is available)

  a) In renal patient Crcl <30 b) unstable patient

Dose of heparin(should monitored with PTT):

Therapeutic heparin Iv in:

a) MI : 80 u /kg bolus then 12 u /kg/hr
b) Pulmonary embolism :80 u /kg bolus then 18 u/kg /hr
} infusion

If infusion not available , Start 5000u iv every 6hrs , repeat PTT (every 6-8 hrs) if not in therapeutic level give heparin every 4 hrs } bolus

Therapeutic anticoagulation(heparin) in obese patient acc to

adjusted BW = ideal + 0.4(actual – ideal)

Ideal BW in male = height - 100 & Ideal BW in female = height – 105

⁎ لو الجرعات صح تعدل عليها ، لو الجرعات غلط تردها للصح

Sliding scale	Heparin dosage & action
PTT: 0-39	Give 5000 unit bolus and ↑ heparin by 200 unit/hour ,repeat ptt in 6 hours .
PTT: 40-49	↑heparin by 100 unit /hour ,& repeat ptt in 6 hrs .
PTT:50-69	MAINTAIN same heparin & repeat PTT AT 6AM NEXT DAY
PTT:70-79	↓ heparin by 100 unit /hour ,& repeat ptt in 6 hrs
PTT:80-89	Turn off heparin for 1 hour ,then restart heparin by rate of 100 units/hour less than current rate & repeat ptt in 6 hrs
PTT :90 or above	Turn off hreparin by 1 hr then decrease by 3 IU/kg/hr عن الجرعة الصح

NB: if the patient is1- unstable 2- PTT is not available3-normal kidney the same dose of clexan /12hr

if 1-PTT is not available in2- renal patient only 3-stable or not → clexan 1mg/kg/24hr,0.8mg/kg if 120:150 kg, 0.7mg/kg if >150kg

لو بيتاخد كلكسان 80 كل 12 ساعة هيتاخد كلكسان 80 كل 24 ساعة.e.g

- **Clexan :**

a)In Crcl >30 b)stable patient c) if PTT is not available

Dose: -In Crcl >30ml/min→1mg/kg sc /12hrs

-In Crcl <30ml /min →1mg /kg sc /24hrs if PTT is not available

-In weight >100 or BMI >40, Crcl ≥30: if 120-150 kg→0.8mg/kg SC /12 hrs on actual body weight , If >150 kg →0.7 mg /kg SC /12hrs

- Arixtra: not proved in AF لو مزنوق اكتبه
- Therapeutic dose: ● 5 mg if < 50 k.g ● 7.5mg if > 50k.g

●10mg if >100 kg

If CrCl<30 no therapeutic arixtra.

Except In case of M.I: therapeutic 2.5mg same as prophylactic غريبه جدا

لازم يعدى على الجرعه 36 ساعه علشان يدخل عمليات

***NO therapeutic thrombex**

E.g

Renal ,unstable, plateltes واقعة ➪ heparin or clexan & follow up يبقي

HIT(أو قلت عن 30 000أوقف)➪ Enteral CrCl >15

Antidote of LMWH: ***Protamine sulphate*** 1 mg per mg clexane if within 8 hrs , if >8hr or bleeding continues after 4 hr after 1st dose , give 0.5mg protamine per mg clexane
For heparin : <1/2 hr :1-1.5mg/100units of heparin 1/2-2hrs :0.5-0.75mg/100 units of heparin
>2hrs: 0.25-0.375 mg /100 units of heparin
→slowly in peripheral line (severe CVS collapse)Not in CVL
☞ 1 mg of heparin = 100 units.

Enteral

*A)Warfarin: 5mg (3-5 days)& with normal INR P(163)

☞B) ***New oral anticoagulants (NOACs):*** (Sometimes increase LFTs).

- Expensive - administerated without bridging with parentral. (1st dose stop clexan)

- Apixaban (eliquis), Edoxaban & Rivaroxaban (xarelto) → anti-factor X.
- Dabigatran (pradaxa) → anti-factor II.
- Not used in patients with1) malignancy, 2) pregnancy,3)mechanical valve & 4)moderate to severe mitral stenosis 5)Epanutin 6)mural thrombosis 7)berlique
- Contraindicated with renal impairment except for apixaban(Eliquis)or xarelto can be given in crcl 15-30) (allowed even in ESRD with AF only).
- Apixaban (eliquis) dose:In DVT &embolism : 10 mg /12hrs for 1 week then 5mg /12hrs 3-6 Months

In AF : Eliquis: start with 5mg /12hrs if →high score for life or
→recent, stable, cardioverted with low score 4wks

NB: Half dose if score ≥ 2 (2.5 mg/ 12hrs) :
اللى وزنه اقل من 50 او سِنه أكتر من 80 لازم ننبه عليهم يعملوا creatكل شويه و يشرب سوايل كتير.
Contraindicated in Crcl <15

- Xarelto: in DVT & PE dose:1mg/12hr for 3 weeks 20mg/day 3-6 mon.

In AF 20 once if →high score for life or
→recent, stable, cardioverted with low score 4wks.

CrCl 15-49 in any indication 15mg instead of 20mg
*Eliquis may given in end-stage renal with AF but not with DVT or PE.

NB Therapeutic anticoagulation should be continued after cardioversion **for life** in high score (with score ≥ 2 in males or ≥ 3 in females) or **for 4 weeks** only in lower scores.

4-Treatment of co-morbidities (1- Chronic problems in history 2-examination 3-investigation):

NBمن البر(الإحسان)للأهل توزيع الأدوية على أيام الأسبوع **صندوق الأيام في الصيدلية**

e.g,A) Diabetes →1. Insulin or oral hypoglycemic(fixed dose once resume1- adequate oral feeding and 2-not on inotrops3-no IV glucose 4-أكل مرضي السكر)

2.statin(in patients aged >40ys & if <40 ys do lipid profile,liver functions& CK)

3.becozyme amp/3days.or neutron tab. Or multi-vitamins tab..

B) Hypertension →

continue on previous treatment unless **:**

a) **1)**contraindicated, e.g, shock.

Or 2) change if not the best option in his comorbiditie.

⮱1-co-morbidities 2-CI 3-side effects 4-interval 5-doses+ متوزعين في مواعيد مختلفة

b) ☞ Usually reach the maximum dose of a single drug before adding another one unless the medical history requires 2 or more drugs.

(don't use 2 drugs of the same groups)

e.g, 1) Diabetes + mitral valve prolapse with tachy-arrythmia →

give ACEI or ARBS (↓protenuria in CKD>> follow up ,AKI >>isoptin) + BB

2) Ischemic heart with poor contractility (don't use 2 drugs of the same groups)

→ give BB + ACEI or ARBS(remodling) + Aldactone(remodling)

C) CKD P(230) →1.iron(no with inotropes) &eprex 2. Calcimate ±one alpha 3.statins

D) liver cirrhosis1-liver enz. ,bilirubin ,INR ,albumin 2-plateltes 3-↓Na ,U/S 4-ascites 5- حملة 100مليون صحة P(239)6 acute و ساعتها أفكر في

F) IHD : P(143) → a) history b) ECG c)ECHO d)CABG or not e) PCI or not

☞ Eltroxinمستورد ولا مصري is administered at 6 AM مع صيام ساعه قبل و ساعة بعد

If ryle ↑the dose 25 mcg

زى الكلكسان prophylactic بيتاخد الساعه 6 بس مساءا

لو عيان عنده مشكله chronicومش متظبطه احسن حاجه ومحتاج يخرج متابعه مع دكتور تخصص لومش مزنوق بلاش يخرج خميس ولا جمعة لو مش متظبط وأطلعه علي العيادات أو حد بره.

5. Treatment of examination findings & investigations:

e.g, wheezy chest → bronchodilators start with farcoline علشان متوفرunless contraindicated.

In wheezy chest: use corticosteroids that have a predominant glucocorticoid effect i.e, Solumedrol if not responding to bronchodilator (not solucortef which is predominantly mineralocorticoid).

Dose: IV: 125 mg/6-8 hours, Oral: Solupred 30-60 mg/24 hours

Equivalent dose in mg

Hydrocortisone(solucortef) 20 =Prednisolone(solupred) 5 = methylprednisolone(solumedrol) 4 = Dexamethasone(decadrone)0.75

* **مفيش حاجه اسمها عيان ماينامش / ما يتفنتلش / ما ياخدش علاج بس سياسيا(consult+consent)**

6. Treatment of labs: يتصلح و يتعاد و يبقي معايا **document** و أبلغ ال م.م فى أسرع وقت

e.g,a) ↓K^+ → target 4.5 mEq/L … But in renal impairment, the target is 3.5 mEq/L with cautious correction (2 ampoules then reassess). **ويتعاد في نفس اليوم p.215**

b)↑creatinine →1 -daily calculation of creatinine clearance ويتكتب في ورق العلاج +-2 drugs adjustment. أنا و أدويتي لنا دور ولا لأ 3-nephrotoxic drugs or prerenal cause

☜ لو شكيت إن نتيجة المعمل غلط عيده **خلال نص ساعة** . و تطلع به بنفسك لو هيفرق مع المريض

7. Vitamins & other supplements: especially in burn patients ... Consider formulas.

8. Nutrition:5+5 **1**-Route(enteral ليه مش)&2-volume(subtybes) &3- content صايم كام) ساعه (→ see nutrition P 262+4- RBS frequencyوتتكتب فى ورق المحاليل مهم

5-Lines

9. Ventilator care bundle: ±7

1. Anticoagulant.
2. Antacid.
3. Oral care → chlorhexidine prevent microaspiration (DG care) not daktarin with tongue depressor+شاش or فرشة
4. Head elevation 30^O.
5. Daily sedation vacationلو فايق و هادي ملوش لازمة unless contraindicated to asses conscious level and lateralization esp. in COVID patients (a-status epilepticus,b- brain edema & c-ARDS 1st 48hrs on tracium).
6. Assessment of readiness for weaning → If ready:

±7 spontaneous breathing trial/24 hrs.

10. Care of bed ridden patients (comatose, paraplegic [retension بيحصل له] or quadriplegic):

- DG care & oxypol (مرهم عين)if ventilated.
- Care of bowel لازم تعرف بيعدي ولا لاء→ laxative or enema.
- Care of eye : to prevent corneal ulcer.
- Management of bed sores:

Prevention: Mattress لو مش منفوخة الدكتوروالمريض هيضر& frequent repositioning جدول تقليب تمضيه جلد ناشف +انت

Treatment: Prevention + طوق + Mebo if 1st degree, Iruxol if 2nd degree & surgical debridement if 3rd degree±vaccum(انت تقترح) for healing of C.T or decontamination of bacteria & necrotic tissue±diversion colostomyانت تقترح if near to anus

- Assessment for DVT: Well's score p (49).(every 4 weeks)

☞ **Terminal cancer:**

- No cure for the cause of ICU admission, e.g, DCL due to brain metastasis→No CPR..
- While as metastatic cancer patients admitted for a curable complication should be treated effectively, e.g, pneumonia in a patient with cancer breast causing respiratory distress & hypoxia.

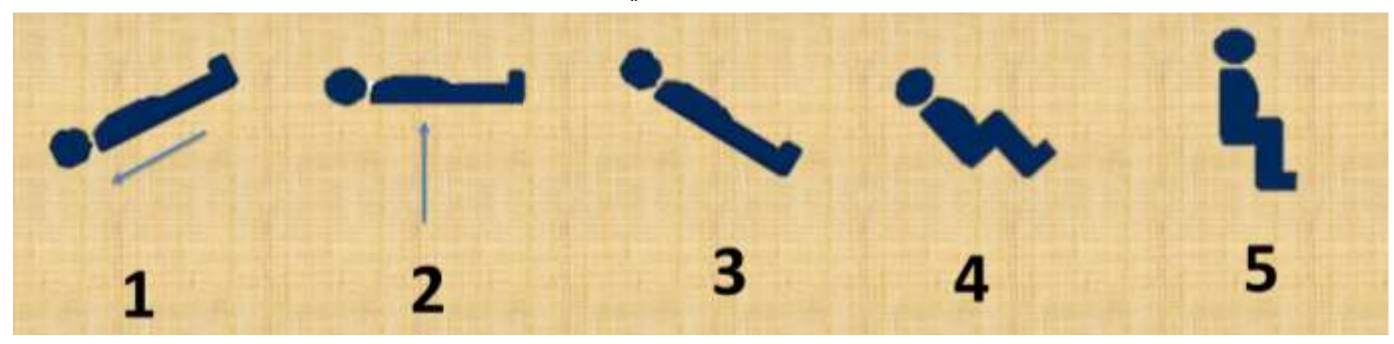
☞ **DNR decision (do not resuscitate):**

قرار بياخده الكبير ولو انت الكبير وشكيت للحظة يبقى العيان ده for CPR

11. Physiotherapy & Out of bed:

حتى لو انت متضايق والعيان متضايق والتمريض متضايق هيقعد علي كرسي ماعدا ساعتين العصر ... احنا مش جايين ننفذ طلبات المريض←من اجلك انت ،لو لقيت العيان علي السرير هنفخك .

☜ هام جدا : اى عيان مش على inotropes 1-صور الجرح و2-الـ stoma و3-الـ echo ولازم يبقى قاعد على كرسي لمصلحتك الشخصيه ← عشان لما الدكتور يمر مرجعش أنيمة تاني



- ممكن تقلب السرير كرسى (لو علي inotropic support أو ventilated or morbid obese) لازم السرير يكون فيه ال 5حركات

1-راس العيان تخبط فوق ← خلية الاول tredlenberg علشان يتزحلق معاك بسهوله وشده من ملاية وسط علشان ضهرك
2-ارفعه كله لاخره one unit
3-اقلب السرير قطعه واحده antitrendlenberg
4-ترفع الراس وتنزل الرجل

- ***morbid obese***
- **العائله تنزله**
- **او ينزل بنفسه (وطى السرير ويزحزح نفسه بالراحه ويقف و رجله تلمس الأرض وهو باصص لفوق ويسقط نفسه على كرسى قريب أو ممكن أجيبله مشاية)**
- **تقلب السرير كرسي**
- الزق بلاستر بطول دراع العيان إنه ممنوع قياس الضغط أو تركيب كانيولات ع الناحية دي

1- AV fistula موجوده او بتحضر لعملها or 2- after MRM(modified radical mastectomy& axillary evacuation) or 3- upp. Limb DVT

12. Hopeless case:

1. الجسم سليم → 1-prevention of bed sores,2- avoidance of mouth angles injury by ETT حط قطنتين شاش علي الجانبين &3- no need for tracheostomy.مش لازم يتبهدل فى الغُسل
2. Pain free حسن الخاتمة تدريجي (تلقين وصلاه يتيمم ويصلى فى اى تجاه)..

➢ **Sedation of neurosurgical patient:**

1) Precedex(amp.200mic)maintains adequate cough (1mic /kg over 30-60 mins loading (1/2amp)then 0.2-0.7 mic /kg /hr maintainance (5-10cm/hr), SE:bradycardia ,hypotension ,
2)Haloperidol, 3)Seroquel(25-50-100) /8hr-12hr-24hr or 4) resperidal.

Haloperidol forms: 1.Oily (IM) العلبه 1 امبول → 50 mg .

2. Watery (IV) العلبه 3 امبولات→ 5 mg-2.5mg titration maximum 30mg.

➢ Haloperidol has extrapyramidal manifestation →كلم النيورو قبل اعطاؤه

5)Olapex in COVID

➢ ازاي تربط ايد العيان في السرير؟؟ ← 2 دريسنج مقفولين ببلاتسر عشان ميفرولوش ← لفهم حوالين رسغ العيان وعدي من تحتهم رباط شاش مربوط في السرير فالعيان لو شد ايده ← رباط الشاش هيشد ع الدريسنج مش على إيده التثبيت في المسند السفلي للسرير .

➢ لو عيان عنده fracture clavicle بنجيبله arm sling أو بنعمله واحدة بالشاش و 2دريسنج دايره حول رقبته علشان يكفوا يغطوا رقبته كلها و fixation 2 points واحده عند ال elbowوواحده عند ال wrist.

➢ ازاي تثبت الأنبوبة برباط شاش من غير ما يشد على بوق العيان زي اللجام ؟؟ ← شاشة على mouth angles تحت رباط الشاش أو دريسنج مخروم .

➢ لو العيان بيشد الرايل او القسطره ← 1-حط قطن في ايده و2-اقفل عليه بجوانتي(الصوابع لجوه) بالعكس زي البوكسنج (بلاستر خلف خلاف و3-بلاستر على ال wristو4-شاش رابط ايده لتحت وخرج ال thumbعلشان ال pulse oxymeter.

➢ لو مفيش airway متحطش سرنجة في بوق العيان هتعور ال hard palate.

➢ دماغه مايله :اعمل ⌒ بأزازتين محلول ،مربوط بينهم برباط شاش و ملفوفين بقطن و ملفوف ببلاستر (proper padding). او اشترى الجاهزه خصوصا عيان المخ لازم رأسه تكون central

➢ لو عيان مات ومركب CVL وبعد ما اتشالت بتجيب دم ومبتقفش اقفلها بغرزة ← يخرج بغرزة احسن ما دمه يتصفى

➢ العيان اللى بيتزحلق ← ملايه مبرومه من تحت باطه و تتربط فى راس السرير و dressing تحت الaxilla علشان ميحصلش brachial plexsus injury و ارفع رجل السرير

➢ اى عضمه مكسوره تتثبت مفصل فوق ومفصل تحت

➢ المريض اللى على شده لازم 1) رجله معدوله 2)2كيس ومش على الارض 3) الشده من الكعب مش الصوابع 4)تقليب وتثبيت بسرعه علشان مايحصلش قرح فراش وتجيب طوق

➢ الشدة: أحد أهم أسباب ال bed sores لازم تسعى إنه يتثبت بسرعة.

➢external pelvic fixator : الشانزات ممكن تعور بطن العيان جامد لو بطنه كبيرة خلي بالك و حط شاش

➢01098318072 : العلاج الطبيعي المسئول عن تركيب اطراف صناعية لمرضي البتر في القصر العيني

هتسمع كلمة Corrected فين:

- Corrected Calcium p(226)
- Corrected Sodium p(210) DKA after 3L (5hrs),{ actual+100ال فوق 100ال عدد }
- Corrected anion gap p(106) AG+2.5(1.5تحت 1gm albuminلكل)

هتسمع كلمة dualفين + أدوية تتاخد على الترولي

Dual antihypertensive(51)

- Dual antiepeliptic(206)
- Dual antiplatelets(138)
- Anticoagulation
- Antihyperkalemic

- **NB**:2ادويه وانت بتكتبهم لازم تركز اوى لان بيحصل interactionsمابيهم ومابين ادويه كتير :

Epanutin(procrolan,nimotop,epilat,NOAC,berlique)

procrolan p(pregnancy,arrhythmia ,epantutin, tegretol)

- ادويه تانيه لما تكتبها ممكن تطول ال QTمثلا زى :

Adminsterating one or more drugs that prolong QT interval :

- هامAmiodarone /sotalol/propafenone(rytmonorm)
- PK merz
- Lacosamide
- Gluconazole /variconazole
- هامLevofloxacin/ciprofloxacin
- Zofran
- Seroquel
- Haloperidol
- هامPlaqunil
- norvasc

(الفكره كلها انك تركز وانت بتكتب الادويه علشان مش كل الادويه بتنفع تتكتب مع بعض)

- اى امبول هتفتحه لازم تتأكد من الاسم وال concentration فى امبولات كتير متشابهه تبص قبل ماتفتحه وبعد ماتسحبه وقبل ماترميه (العيان بيموت)
- لو انت السينيور وندهولك علشان ماعرفوش spinal شوف الفارغ بنفسك او تسحب امبول جديد لانك هتكون جاى بسرعه

Wells Clinical Prediction Rule for Deep Venous Thrombosis (DVT)

Clinical feature	Points
Active cancer (treatment within 6 months, or palliation)	1
Paralysis, paresis, or immobilization of lower extremity	1
Bedridden for more than 3 days because of surgery (within 4 weeks)	1
Localized tenderness along distribution of deep veins	1
Entire leg swollen	1
Unilateral calf swelling of greater than 3 cm (below tibial tuberosity)	1
Unilateral pitting edema	1
Collateral superficial veins	1
Alternative diagnosis as likely as or more likely than DVT	-2
Total points	

DVT = deep venous thrombosis.

Risk score interpretation (probability of DVT):

- >/=3 points: high risk (75%);
- 1 to 2 points: moderate risk (17%);
- <1 point: low risk (3%).

- **dormicum or katalar لو الضغط وحش**
- **diprivan or katalar لو الكلي وحشة**
- **katalar diprivanو أعلى لو الضغط والكلى وحشين**

Richmond Agitation Sedation Scale (RASS)

اختيار ال degree of sedation معتمد على الضغط والكلى ± analgesia

Score	Term	Description
+4	Combative	Overtly combative, violent, immediate danger to staff
+3	Very agitated	Pulls or removes tube(s) or catheter(s); aggressive
+2	Agitated	Frequent non-purposeful movement, fights ventilator
+1	Restless	Anxious but movements not aggressive vigorous
0	Alert and calm	Fully conscious & not-intubated
-1	Drowsy	Not fully alert, but has sustained awakening (eye-opening/eye contact) to voice (>10 seconds)
-2	Light sedation	Briefly awakens with eye contact to voice **(<10 seconds)** →→ **Target score**
-3	Moderate sedation	Movement or eye opening to voice (but no eye contact)
-4	Deep sedation	No response to voice, but movement or eye opening to physical stimulation
-5	Unarousable	No response to voice or physical stimulation

Procedure for RASS Assessment

1. Observe patient ,
   a. Patient is alert, restless, or agitated. (score 0 to +4)
2. If not alert, state patient's name and *say* to open eyes and look at speaker.
   b. Patient awakens with sustained eye opening and eye contact. (score –1)
   c. Patient awakens with eye opening and eye contact, but not sustained (score –2)**target**
   d. Patient has any movement in response to voice but no eye contact. (score –3)
3. When no response to verbal stimulation, physically stimulate patient by shaking shoulder and/or rubbing sternum.
   e. Patient has any movement to physical stimulation. (score –4)
   f. Patient has no response to any stimulation. (score –5)

Balance :

In polyuric or normal patient :

- Target +ve balance : calculate your balance at certain point , then give bolus to reach your target ,then replace output 100%
  e.g. patient daily input 2500ml /day →target +ve 1000 ,after 12 hrs(8 pm) UOP and others 2000 ml, give him 500ml bolus over daily input and UOP should be replaced100% ,after 24 hrs it will be +ve 1000.
  الداخل أكتر من الخارج (المحاليل للصبح)
- Target –ve balance : calculate your balance at certain point ,then stop giving fluids till reach the target balance ,then start to replace every increase in output from his fluids.
  e.g. patient daily input 2500ml /day →target -ve 1000 ,after 12 hrs input(8pm) was 1250ml ,output 2000ml.stop fluids and wait till uop reaches 2250ml.then start to replace the new increase from his fluids.
  المحاليل للساعة 8 وأبدأ ب التعويض.

- لو عيان مش tachy ولا high BP و بيجيب بول كتير سيبه .
- هوقف المحاليل وبعد ما أوصل لل target بتاعي هعوض100% و أبدأ بمحاليله عشان ال nutrientsاللي فيها

In oliguric patient :

As AKI

Malignant Hypertension

SBP ≥180 and DBP ≥120

Malignant Hypertension 7

1) ABC

2) Exclude

1) Pain
2) Shivering
3) Palpate the pulse
4) Intubated patient or pt. on Trachium → proper sedation
5) Cuff with adequate size + functioning

3) Emergency or urgency

Hypertensive urgency :
Def.: BP > 180/120 without progressive target organ dysfunction

Hypertensive emergency :
Def.: BP > 180/120 with impending or progressive target organ dysfunction

4) Treatment

Selection of oral acc. To

1- Comorbidity
2- Contraindications
3- Side effects
4-Interval
5-Doses
6- توزيع الادوية في مواعيد مختلفة

مختلفة الأدوية تتوزع في مواعيد
و قيس الضغط قبل كل دواء
لو 4 أدوية : 6 – 12 -6 -12
لو 3 أدوية :8 -2- 10
<u>هام جدا</u> خلي بالك خلال أسبوع لشهر عادة الضغط بينزل وبنبدا نسحب الادوية ، وفهم الاهل يقيسوا الضغط قبل كل دواء ويخرج يتابع مع دكتور القلب

5) Resistant

In case of tridil tolerance :Max. tridil :40ml/hr.

1) High dose hidonac
2) Use alternative iv drugs or dual IV agent such as phentolamine/ rogitamine or labetalol infusion.

In case of resistance to max dose of 6 medications or less if one or more of 6 are contraindicated+ ttt of secondary cause if present:

1) Increase Concor dose up to 20 mg/day.
2) Consider oral Epilat. & D.C other CCB drugs
3) Assess BP before each medication
4) Eprex is CI with HTN

6) Exclude 2ry causes

1) Thyroid profile (thyrotoxicosis)
2) Cortisol level,
3) Urinary Vinyl-mandelic acid
4) Cholesterol
5) Renal duplex (dysflatyl ,eucarbon صيام)

7) Special subtypes

1. Pregnancy
2. Lactation
3. Disturbed conscious level

Hypertensive urgency : BP > 180/120 without progressive target organ dysfunction
Hypertensive emergency : BP > 180/120 with impending or progressive target organ dysfunction

1) Management ABC
2) Exclude false high & control of
   a) pain b) shivering
   c) palpate the pulse و حط ايدك (if weak) اطفى المونيتور وشغله تانى
   d) In intubated patient or pt on tracium consider proper sedation و العيان اللي بيتنقل من العمليات
   e) Cuff with adequate size(small cuff size false high)+functioning
3) A)Emergency (organ damage)or B) urgency (no end organ damage)except in ischemic stroke
4) A)**In HTN emergency** :a) IV agent single or dual (tridil infusion(↑ICP) or/and phentolamine {superior in neurosurgical patient},hydralazine &labetalol)) + b)single or dual (better) oral antihypertensive drugs except in Ischemic stroke 220/120 or in TPA administration 180/120

(Selection of oral acc. to1- comorbidity 2- CI 3-side effects 4-interval 5-doses فى مواعيد مختلفة)

B)In HTN urgency : oral antihypertensive drugs .

➢ **Treatment**:

a) IN urgency HTN(oral antihypertensive NO IV)

➢ **Target** reduce MAP by 20% in 1-2 Days , with further reduction in weeks to months . **Close monitoring** to ensure complications

b)In emergency hypertension(organ damage eg : retinal hge , ICH ,…)(oral +IV)

Avoid organ hypoperfusion during ttt

➢ **parentral therapy** should be initiated immedially after icu admission
➢ **Target** decrease MAP no more than 20% within mins to an hour , next 2-6 hrs aim for goal BP 150/110 by Maximum dose of single oral anti-hypertensive drug for 1 day if not controlled add another drug + IV agent :tridil or /and phentolamine infusion (except ischemic stroke in which: accepted 1st 2 day systolic 220, and then systolic 180 for 48hrs ,unless
➢ a) ischemic HD,b)congestive heart failure ,c) eclampsia ,d)dissecting aortng aneurysm e) the patient in the window of TPA administration 180 from day 1 because of liability of bleeding with TPA which may convert to hemorrhagic Stroke.
➢ ***NB*** oral →if no contraindication ,In case of 1-NPO patients or 2- short bowel 3-والجراح رافض→give sublingual capoten .
لو عامل anastomosis والجراح مش رافض اديله oralبشوية مايه صغيرين

➢ **Antihypertensive drugs**: (IV &Oral)

Selection of oral acc. To:	1- Comorbidity, 2- Contraindications, 3- Side effects, 4-Interval, 5-Doses, 6- توزيع الادوية في مواعيد مختلفة			مينفعش العيان يمشي على 2 دوا من نفس العيلة لو الدوا الاولاني مش هيقف يبقى مختارش نفس العيلة		
Oral Agents	**Beta blockers**	**ACEIS & ARBS**	**Alpha blockers**	**Calcium channel blockers (potent)**	**Aldomet**	**Diuretics**
Co-morbidities	Rate control mainly, weak antihypertensive 1) IHD: if IHD on BB + BA → give BB) bec. the probability to die of IHD is more than of asthma. 2) MVP & tachyarrhythmia or ventricular extra systole 3) Pregnancy & lactation → 1st choice Labetalol	1) DM (↓proteinuria) 2) IHD e impaired contractility (↓remodeling) 3) Stroke ACEI not ARBS	1) Pheo-chromocytoma 2) BPH → stop tamsulosin	• Aneurysm: Subarachnoid hge → to prevent VC to prevent vasospasm - post operative to prevent massive brain infarction • **Epilat retard**: pregnancy, lactation, malignant HTN • **Isopten**: SVT & ↓proteinuria a) (In renal with AKI) b) not with BB c) contractility > 40%	Pregnancy Mechanism of action: α2-agonist in the brain → ↓sympathetic discharge → ↓BP.	Heart failure
CI & side effects	a) Bronchial asthma b) Decompensated liver disease (hepatorenal, SBP, refractory ascites, Na <120, shock → unopposed α prehepatic ↓hepatic blood flow c) Impotence in young adult males. d) PVD e) Late DM	Renal impairment 1) chronic: relative CI → stop if rising creat. > 50 % 2) AKI: absolute CI		Don't give another CCB unless there is no other option and the patient is still in malignant hypertension **Epilat retard**: aortic stenosis	lactation, hepatic	
Doses & intervals	Drugs /24 hr. **Concor** (1.25, 2.5, 5, 10) or divided in: Poor contractility or recently weaned from inotropes **Tenormin**: (50, 100) **Nebivolol**: (2.5, 5, 10, 20 mg) ↑/2 weeks, max. 40 mg, CrCl <30 ml/min → 2.5 mg/day initially Drugs/12hr **Carvid**: (6.25, 12.5, 25) **Labetalol** (100-200) Max.800mg/8-12hrs	Drugs /24 hr. **Tritace** (1.25-5-10) **Tareg** (40, 80, 160, 320) Drugs/8hr **Capoten** (6.25, 12.5, 25, 50) (oral or sublingual)	Drugs /24 hr. **Cardura** (doxazocin): 2-16 mg Drugs/8hr **Minipress** (prazosin): 1-7mg Max dose 20mg/day	Drugs /24 hr. **Norvasc**: 5-10 mg S.E. → LL edema & prolongation of Q T Drugs/8hr **Isopten**: max 160 mg or retard **Epilat**: 10-20 mg, max 40mg/8hr or 120 mg /24hrs **Epilat retard tablets** 20mg, max 120mg → shouldn't be crushed → ☒ Ryle.	0.25 – 1gm /8hrs.	Hydro-chloro-thiazide, Lasix or Aldactone (25-50-100).

IV agents	Tridil	Phentolamine	Labetalol	Hydralazine
Available preparations	2 available preparations: amp 5 mg/ml(50mg) & vial 1 mg/ml (50mg). How to prepare for infusion: الفيال بيتسحب زي ما هو علي سرنجة 50	(amp. 5mg/ml)	amp.20mg/4ml,vial:10 0mg/20ml)	amp(20mg)
Doses	0.5-10 mic/kg/min. Infusion of 2 ml/hr. = 0.5 mic/kg/min Max. rate (dose): 40 ml/hr (10 mcg/kg/min.).	bolus dose 5-15 mg ,Maintenance dose :5-40mg/hr. 5 ampoules على سرنجة 50سم	1-2 mg/min max dose 10 mg/min	5-10 mg initially then 5-10 mg / 20-30 min PRN or 0.5-10 mg/hr. infusion

Combinations	Dose	Ryle ?
Exforg = ARB (valsartan) + CCB (amlodipine)	80mg/5mg ,80mg/10mg ,160mg/5mg ,160mg/10mg , 320mg/5mg ,320mg/10mg	☒ ryle. (coated)
Exforg HCT = ARB + CCB + Hydrochlorothiazide	80/5/12.5 or 25 , 80/10/12.5 or 25 ,160/5/12.5 or 25, 160/10/12.5 or 25 , 320/5/12.5 or 25 , 320/10/12.5 or 25	☒ ryle. (coated)
Cotareg = ARBS +Hydrochlorothiazide	80mg/12.5mg , 160mg/12.5mg ,320mg/12.5mg , 160mg/25mg , 320mg/25mg	☒ ryle
Concor plus= Bisoprolol + Hydrochlorothiazide	5mg/12.5mg ,10mg/25 mg	

هام جدا خلي بالك خلال أسبوع لشهر عادة الضغط بينزل وبنبدأ نسحب الادوية ، وفهم الاهل يقيسوا الضغط قبل كل دواء ويخرج يتابع مع دكتور القلب.

- In intubated patients → consider proper sedation.

Pregnany induced HTN

In preeclampsia

4gm MgSO4 shot ,then 1gm every hour for 24-48 hr

*Mg is C.I in renal impairment *mg is monitored by a) serum ,b)reflexes c)UOP d)bradycardia e)kidney function

PREGNANCY HYPERTENSION → (BP ≥ 140/90) (SEVERE HTN : BP ≥ 160/110) TARGET < 140/90		
Chronic (HTN 20 weeks before pregnancy)	Gestational (new onset after 20 weeks)	Pre-eclampsia (new onset + proteinuria (ACR>30) +/or new organ dysfunction)
DRUG	**DOSE**	**CONTRAINDICATION**
LABETALOL (LABIPRESS)	100 -200 mg /12H MAX 800 mg /8-12 hrs	Bradycardia, Asthma ,Pulmonary Edema
NIFEDIPINE (EPILAT RETARD)	20 mg /12H <u>ORAL not sublingual</u> MAX 80 mg /day	Aortic stenosis SE: flushing /headache
METHY DOPA (ALDOMET)	500 MG LD then 250 MG /8H MAX 3G/DAY	Liver disease SE: drowsiness / depression
HYPERTENSIVE EMERGENCY	400 mg oral Labetalol + 40 mg <u>ORAL</u> Nifedipine + IV REGIMEN	
1ST line→ IV HYDRALAZINE :5-20 MG over 10-20 min then 1-12 mg/H infusion 2nd line → IV NITRATES		
IV MgSO4 for prophylaxis of seizures: LD: 4G slow IV over 15mins at labor onset then 1-2 g /hour for 24 h after delivery Monitoring during infusion (UOP >100 Ml/Hr, RR > 12 BPM, NO alteration in CL or REFLEXES (knee jerks) If any alterations → consider toxicity → interrupt infusion, measure Mg level and give 500 mg Ca gluconate as antidote		
IM Dexamethasone: 6 mg q 12h IM for 2 days (usually given to women at risk of preterm delivery to accelerate fetal lung maturation)		
BREASTFEEDING ----> LABETALOL / NIFEDIPINE same as before **(Aldomet Contraindicated in breast feeding)**		
ACE → CAPTOPRIL 12.5-25 mg twice max 50 mg three times ENALAPRIL (Ezapril) → 5-20 mg once daily		
B blockers →ATENOLOL (Tenormin) 50-100 mg in 1–2 doses METOPROLOL (Selokenzoc) →100-400mg/day in 2 doses		
For lactation cessation: DOSTINEX (CABERGOLINE) → 1 MG (two tablets) as SINGLE DOSE		
Ref: NICE 2019 /ESC 2018		

✋ Pregnancy :labetalol ,epilat ,methyldopa ,CI :cordarone ,procrolane ,if BB is used cautiously →causes bradycardia to the baby.

- termination of pregnancy± IV,oral اختار من بتوع الحمل
- Do not forget Dexa if preterm

✋ **lactation** :labetalol , epilat ,captopril , Esapril

NB: IF not responding to *intial dual oral treatment.* Exclude secondary causes:

a)thyroid profile(thyrotoxicosis) ,b) cortisol level, c) urinary venilyl-mandelic acid d)cholesterol & e) renal duplex (dysflatyl ,eucarbon ,صيام)

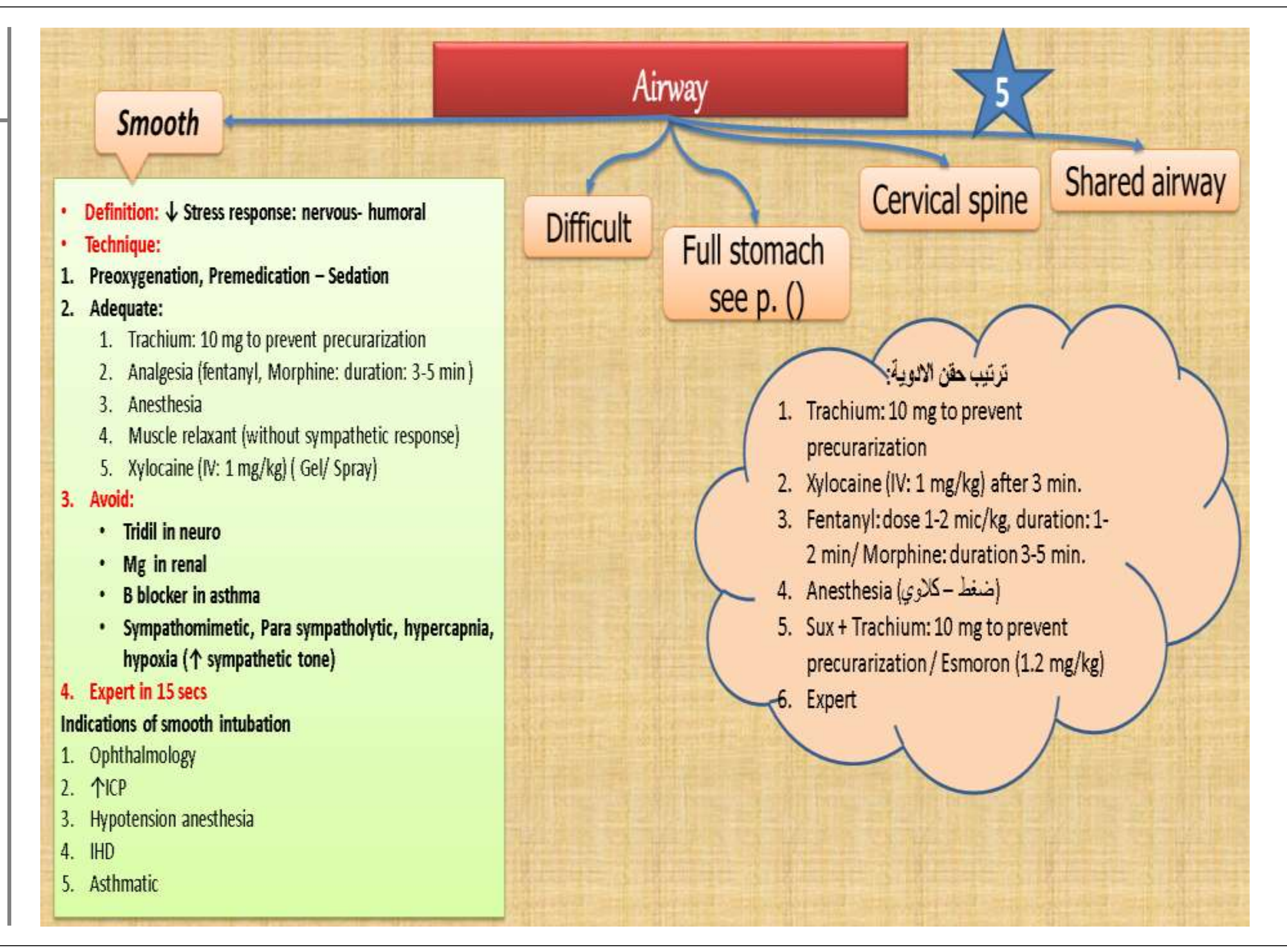
Hypertension with DCL

DCL+malignant HTN +CT free suspect a) hypertensive encephalopathy or b) stroke

DD ***1)***Latralization 1-pupil 2-facial 3-bapinski يبقى stroke

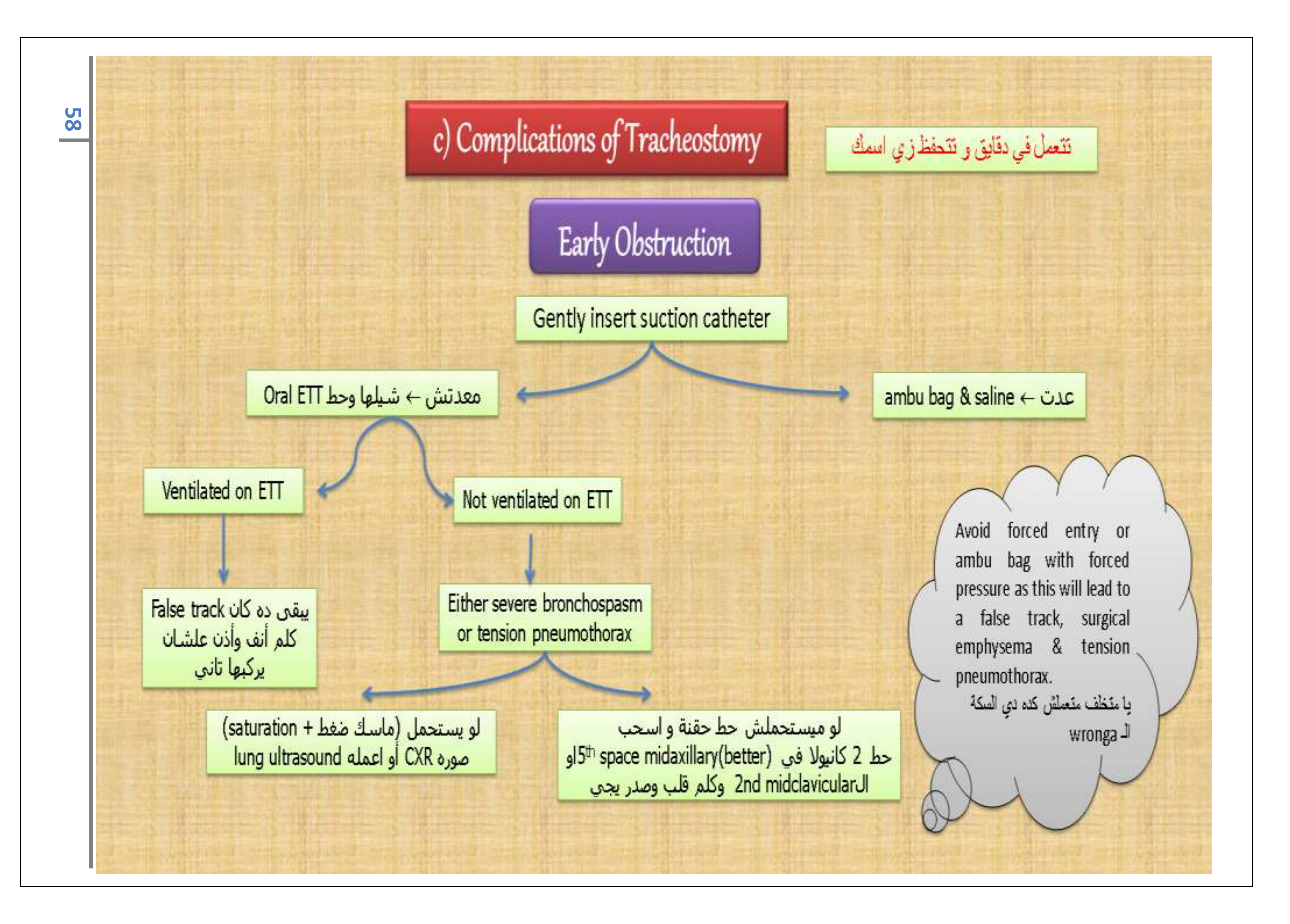
IF not ***2)***MRI with diffusion for DD

Hypertensive encephalopathy لو مفيش MRI انزل بالضغط ساعتين لو إتحسن تبقى


Airway
5
Smooth
Difficult
Full stomach
see p. ()
Cervical spine
Shared airway
• Definition: ↓ Stress response: nervous- humoral
• Technique:
1. Preoxygenation, Premedication – Sedation
2. Adequate:
1. Trachium: 10 mg to prevent precurarization
2. Analgesia (fentanyl, Morphine: duration: 3-5 min)
3. Anesthesia
4. Muscle relaxant (without sympathetic response)
5. Xylocaine (IV: 1 mg/kg) (Gel/ Spray)
3. Avoid:
• Tridil in neuro
• Mg in renal
• B blocker in asthma
• Sympathomimetic, Para sympatholytic, hypercapnia, hypoxia (↑ sympathetic tone)
4. Expert in 15 secs
Indications of smooth intubation
1. Ophthalmology
2. ↑ICP
3. Hypotension anesthesia
4. IHD
5. Asthmatic
ترتيب حقن الادوية:
1. Trachium: 10 mg to prevent precurarization
2. Xylocaine (IV: 1 mg/kg) after 3 min.
3. Fentanyl: dose 1-2 mic/kg, duration: 1-2 min/ Morphine: duration 3-5 min.
4. Anesthesia (ضغط – كلاوي)
5. Sux + Trachium: 10 mg to prevent precurarization / Esmoron (1.2 mg/kg)
6. Expert

CARE OF CHRONIC DEVICES




c) Complications of Tracheostomy
تتعمل في دقايق و تتحفظ زي اسمك
Early Obstruction
Gently insert suction catheter
Oral ETT معدتش ← شيلها وحط
ambu bag & saline ← عدت
Ventilated on ETT
Not ventilated on ETT
False track يبقى ده كان
كلم أنف وأذن علشان
يركبها تاني
Either severe bronchospasm
or tension pneumothorax
(saturation + لو يستحمل (ماسك ضغط
lung ultrasound صورة CXR أو اعمله
لو ميستحملش حط حقنة و اسحب
5th space midaxillary(better) حط 2 كانيولا في
2nd midclavicularالـ وكلم قلب وصدر يجي
Avoid forced entry or ambu bag with forced pressure as this will lead to a false track, surgical emphysema & tension pneumothorax.
يا متخلف متعملش كده دي السكة
الـ wronga



1. **Wash**   1-تتغسل كل شيفت بعد اليوم الخامس و2-النايب موجود في الأوضة

تتغير على أكبر قسطرة تشفيط ينفع تعدي في الأنبوبة عشان القسطرة متبقاش kinked وتدخل في false track (بره مصربيغيروها على ETT مقاسها أصغر).

2. **Orifice narrowing: (healing)**

Either use a smaller tracheostomy tube على قسطرة تشفيط

<u>or</u> ask ENT to widen the opening (release incision).

<u>or</u> insert inner & outer tracheostomy tube. (as a stent ← outer بتغسل الinner و تسيب ال)

لو العيان هيتوصل على الفينتلاتور نشيل الinner و نحط international بتاعة انبوبة عادية

If failed insert oral ETT.

3. **Weaning:** Daily assessment of readiness for weaning → ventilator منها مش من ال

1- الصبح و 2- المريض قاعد في الأوضة و 3- أبص على العيان frequently

IV access خصوصا لو فترة طويلة في الرعاية

Inner & outer fenestrated (gradual weaning) → 500 غالية ب

1- Half closure for 24 hrs → If tolerated → complete closure for 24 hrs. → If tolerated → remove it & cover the opening by clean dressing.

2- انت واقف و تفضل جنبه شوية لو مش موجودة ممكن أجيب tracheostomy tube عادية وعند الـ max. curvature أقطعها أو أعمل ٣ خروم لو معرفتش شيلها و اقل مرة واحدة و

3- هام جدا جدا If the patient become distressed (subglottic stenosis: below the vocal cord and above tracheostomy) → re-open it & never repeat the trial again. Instead, arrange for:

a) multi-slice CT neck fine cuts,

b) direct laryngoscopy to exclude subglottic stenosis & fiberoptic أتأكد ان الدنيا سالكة من فوق

Chest Tube

Indications of chest tube (2)

❶ Pleural effusion
(Serous → massive/ pus → must be drained/ blood → moderate or massive):

➤ To avoid –ve pressure pulmonary edema:-
In effusion: Empty 500-800 ml/6hr , 200 ml/2 hrs.تقا تقا

1. Pig tail, CVP or mahurkar
2. Chest tube

In hemothorax: مرة واحدة
Chest tube only: thick, viscid

Manage as bleeding p. (114)
(1-spont (search for causes) or 2- trauma or 3- ruptured aortic aneurysm: sealing fistula: (لو ركب فيه chest tube هيموت, تركب لو بيموت و انت بتحضر للجراحة)

-Recent :if >1500ml close monitoring هام, optimize ABC p(3), Replacement and follow up ,If >250 ml /hr. consider surgical intervention.

❷ Pneumothorax (هواء):
Minimal: conservative unless ventilated
Moderate & severe: Drain

For Insertion (10)

1- Respect hierarchy:
قلب وصدر – جراحة – رعاية ... حسب المكان اللي انت فيه

2- Witnessed: be attendant during insertion, ↓peep

3- Pain-free: local & systemic.

4- Patient preparation:

1. Labs: Platelet count & INR, (esp. with Aspocid) especially if hepatic or on anticoagulant or antiplatelets → If abnormal:
    1. immediate correction
    2. Insertion of Pigtail
    3. Stop Clexane if therapeutic unless urgent.

5- CXR: check diaphragmatic copula on right side.
If elevated (liver) → نبه علي الجراح يركبها في مكان أعلى
N.B, In hepatic patients with pleural effusion → pigtail is preferred than chest tube due to 1- poor healing after removal, 2-coagulopathy.

☞هام جدا 6- Confirm pneumothorax before insertion through aspiration with a syringe → if no air → don't insert a chest tube & do CT chest or CXR. off peep or ↓

7- Prepare for the procedure:

- صينية تعقيم وخيط Silk 1/0 غرزتين
- برطمان مليان ٥٠٠ سم و بلاستر بالطول وومتقفلش فتحات البرطمان .
- مؤقتا: زجاجة saline فيها خرمين

8- Connect
- الأنبوبة واصلة علي الفتحة اللي فيها عمود تحت سطح الميه وتتلزق ببلاستر عشان محدش يفكها ويوصلها بفتحة غلط فتدخل هوا جوه صدر العيان . - الفتحة الكبيرة مقفولة لوحدها

9- CXR after insertion.

10- الانبوبة واصلة تحت المياه. :البرطمان

Removal (3)



- 10-14 days → risk of empyema → افرك عشان تتشال → if 1- no oscillation , 2- و هي فاردة

❶ Clamp for 4-5 hours before removal then do CXR:

- If pneumothorax recur → open it again.
- If not → remove then do CXR.

❷ Any diminished air entry → consider pneumothorax.
(once pneumothorax always pneumothorax).

❸ Mechanical ventilation is not a contraindication for chest tube removal.

NB: ↓ PEEP:

- Transient: ❹
    1. CVL insertion
    2. Chest tube
    3. Thoracotomy
    4. ECHO
- Permanent: ❷
    1. Air leak
    2. Rt side dilatation

Problems of chest tube



Surgical Emphysema

-**Demarcate** its lateral, upper & lower borders on patient's skin **with a marker** every 6 hours:

a)If increasing despite chest tube patency with minimal pneumothorax → consider **tracheal tear** (tracheostomy or repair).

b)If increasing in presence of pneumothorax → manage as persistent pneumothorax.

C) Pneumomediastinum: p. 272

1-carina نزق الانبوبة لجوه+ تفضل فوق ال
2-Bronchoscope to detect site & size of defect
3-US / 8hrs, 4- CXR daily
(3-4 to detect minimal pneumothorax before tension)
5-↓peep, TV, 6- Surgical intervention to repair tear

d) TOF →

1- as pneumomediastinum
2- upper GI to detect site or bronchoscope or gastrografin
3- Clipping or stent من لجنة الزكاة و الصدقات

Air Leak

فقاقيع الهواء بتبقل في الأنبوبة الصدرية

- Use **lowest possible 1- tidal volume &2- PEEP** to allow healing ± surgical intervention

3-.increase RR acc to PH &PCO2

- In case of excessive air leak affecting oxygenation → consider
1) single lung ventilation using double lumen ETT till healing occurs → If still affecting oxygenation → consider:
2) surgical repair.

- If air leak persists for **> 10 days** → consider major tracheal or bronchial tear for surgical repair.

Oscillation

if stopped → either:
1 Lung expansion
2) Chest tube obstruction
3) Endobronchial obstruction
→ **do CT chest** .

Persistent Pneumothorax

- اعمل اللي عليك الأول: اتأكد ان كل الخروم جوه وان الـ chest tubeنفسها جوة في الـ mediastinal window مش راشقة في الـ lung

- **Bronchoscopy** → confirm bronchi patency (عشان لو مسدودة الرئة مش هتفرد)

- **Obstructed tube** → insert another chest tube سلكها بسرنجة رايل.

- **Connect to low vacuum→ partial clamping** توطية الشفاط من الحيط او احط clampعلى الخرطوم

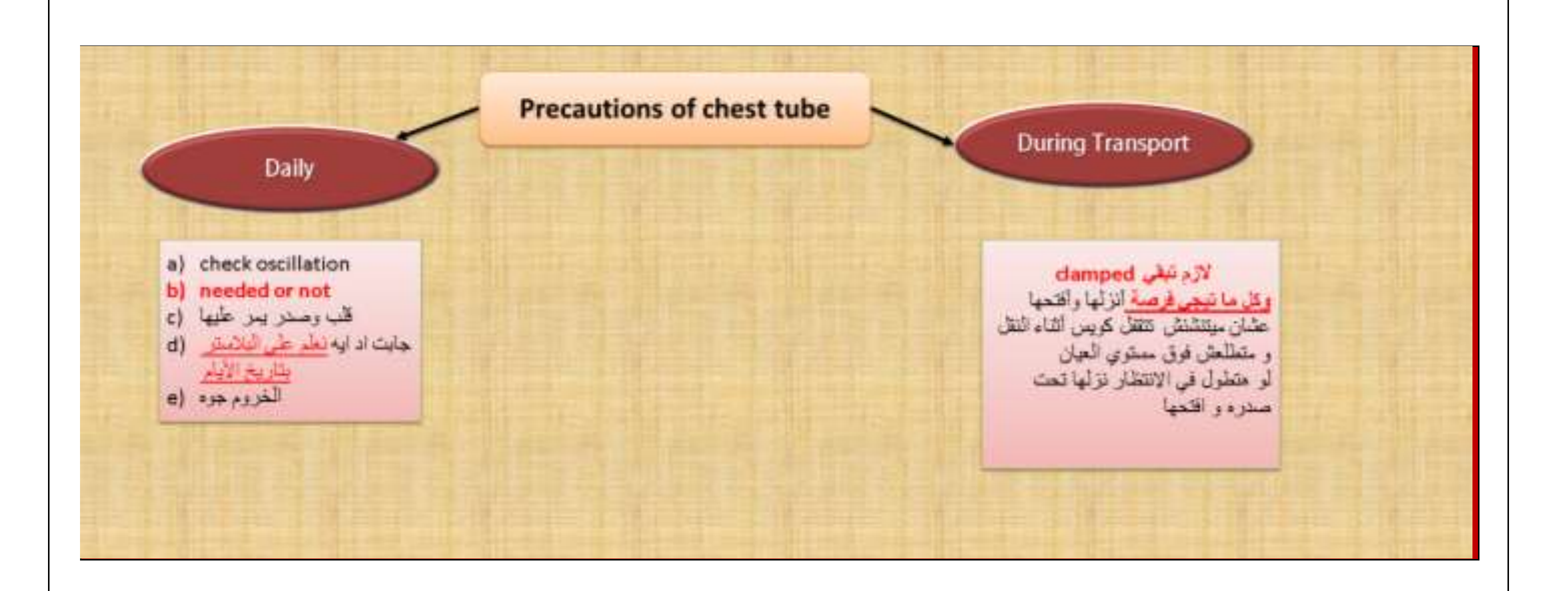
- **Pleural thickening (mediastinal window)** →
a) consider decortication(outer border of collapsed lung),

NB: If recurrent

ممكن حقن مادة irritant زي البيتادين تعمل adhesiolysis (عمليات قلب و صدر)

NB: In loculated effusion or hemothorax:

احقن streptokinase 3 بحل علي 100 سم و يترك 3 ساعات



Care of central venous line (7 points) تتحط بتعقيم كامل

أي حاجة على سرنجة تمشي لوحدها وصلها directly بالـ CVL او الكانيولا او لو هتحط صمام ثلاثي حطه في الكانيولا علي طول(بلاش تحط extension line) .

1-CXR:

site& side : بتتأكد منها انها بتاعة العيان ده

Position: 2nd rib anteriorly Rt side→rare situation :Lt sided SVC → coronary ostium open in it →problem if the patient is ischemic .

Not complicated with pneumothorax (lung border) →apex , costophrenic angle , all border .

2-Back flow من كله

3-Not infected→ شرطة مشرط صغيرة →ابص علي لونها و اعصرها بتبقي حمرا و عاملة زي حب الشباب

4-Transparent cover or sterile dressing.

5-Dated (insertion & غيار)

6.مقفولة بغطيان →to avoid a)infection b) air embolismمهم جدا وخطر c)bleeding

7-هام جدا CVP اي عيان مركب→ a) blood gases لازم تتسحب منها المعامل و ال →except ABG in hypoxic patient →especially b) in pediatrics and difficult cannulation ممكن تركبها عشان المعامل بس.

8. peripheral cannula لو في line واحد متحملش عليه جامد، ممكن تركب

- **:CVL insertion قواعد ال**

a-لو فى سونار حطها b-ولو مش عارف جرب مره او اتنين c-ولو جبت pneumothorax ماتدخلش الناحيه التانيه
d-لو قفلت معاك استنى حد كبير لو فى peripheral line، لازم تعرف تركب blind الاول، لازم تعمل localization
بسرنجة 3،5 _نقول يا رب استرنا

1-تعقيم كامل

(1-جوانتى معقم 2-جاون 3-فرش معقم 4-لو مفيش فرش حط جاون معقم على العيان
5-صينيه 6- overhead 7- ماسك)

2-انت والسونار والعيان in the same line بحيث تبقى شايف السونار قدامك

3-هتبعد عن ال probe بسن الابره نفس مسافة ال depth of the vein وادى زيلوكين الاول

4-ال probe محطوط فى جوانتى معقم ومقطوع طرفه كأنه استك بحيث يمسك ال probe وتحط sterilium تحته علشان الصوره تبقى كويسه +لو لوحدك امسكه بال medial is medial + non dominant

5- وبعد ماتخلص تنظف السونار وتقفله .

6- لو فى اى وقت مابتجيبش flow لو lumen واحد خرجها شويه بره و flush جامد لو ماجبتش خلاص شيلها

7- during insertion as chest tube & thoracotomy decrease peep or off peep

NB: ↓peep :

* transient :

→in CVL insertion →chest tube
→thoracotomy →ECHO

*Permenant:

→ air leak → RT side dilatation

8- اعمل a- lung us وبعد ماتحطها اتأكد ان فى sliding of 2 layers of pleura و + b- c x-ray -بص على ال turbulence in Rt ventricle بالايكو inject saline rapidly into CVL it will pass to rt atrium← then rt ventricle (causing turbulence)

9- فتحة الجلد بالمشرط تكون صغيره جدا علشان ال infection

10- ممنوع تغير على guidwire نهائى الا لو مضطر خاصة لو ماهوركر لانه واسع وممكن يعمل massive air Embolism

11_ لازم صوت الmonitor يكون عالى..to detect arrhythmia

- الاطفال CVP ممكن تخش بكانيولا زرقا

Blind IJV :

- Vein lateral to the artery
- Trendlenberg position
- If pediatric →bolus 10ml/kg or compress liver

} علشان يملى

- Localize with 3cm syringe →depth &directions
- The pivel is usually large →collapse the vein→transfixation تجيبه وانت راجع

Subclavian :ثلث و تلتين* *دراعه مشدود باصص الناحية التانية

*الناحية المشطوفة لتحت pivel تحت

*نقيس العيان depth= اد ايه(التخين مش زى الرفيع)

*تدخل بـ20-15 angle * Flow ادخل نص مل زيادة بعد ما تجيب

In expert: IJV = Subclavian but subclavian is less infection و اريح فى الحركه

Vancomycin lock

1-Vial vancomycin 500mg +100ml NS هناخد منهم 4مل

2-Amp. Heparin+20ml NSهناخد منه 0.5 مل

هنخلط ال4.5مع بعض و نحقنهم فى الCVl ونقفل 2Lumens و نشتغل ب واحد و نبدل بينهم كل 8 ساعات أو نحقنهم فى الماهوركر بعد كل جلسة غسيل

Care of Ryle

see ryle insertion p.226 *أول ما يدخل أتأكد إنها جوه*

الرايل تكون 1- راكبة أو 2- متركبها

رجع في الرايل معناها < 500مل، اقل من كده نكمل ryle feeding

1. Don't insert it orally in non-intubated patient as it may lead to regurgitation & aspiration.
2. If for feeding → do ryle test.(100ml saline) Flush with water after each feed to avoid fermentation of food inside the ryle which may lead to gastritis.
3. If for drainage → consult when to start feeding & flush to determine if obstructed **مش بتجيب**.

Check gastric air bubbles in CXR: If distended → ryle malfunction (obstructed or not in place).

4. In case of persistent vomiting →a) stop oral/ryle medications
   b) shift to IV alternatives
   C) give prokinetics لبوس جلسرين ± enema
   d) check electrolytes e) ambulation هام
   f) CXR (air fluid level)±ct with oral &IV contrast ±upper GI
5. In case of 1) esophageal tumor or trauma or surgery ,2) gastric tumor or trauma or surgery , & 3) perforated DU : الباقي ركبه سعادتك و لو عدت من تحت تبقي برنس
   - Ryle is inserted only while operating the patient or by surgeon .
   - Don't insert ryle if displaced ,call surgean to insert new one
6. لو مدلدلة بره جامد تبقي outعادة بين شرطتين و تلات شرط و ممكن الغيان يموت و هتتنفخ في المرور
7. الاطفال يستحسن قسطرة تشفيط
8. أقيس على الطفل من بره.

Urinary catheter:

- For any patient with an urinary catheter for along time , before removal of the catheter , its necessary to do an exercise distension يحس(تقفلها 4 ساعات وتتأكد انه حاسس وتفتحها بعدها)
- And if DCL or paraplegic , you should do ultrasound after 1 day to detect urine retention,6 weeks to regain tone

متثبته ببلاستر علي رجله علشان ماتبقاش شادة علي الـ uethra .

1. complete aseptic
2. تعقيم الـ penis وورقة جوانتي
3. جل معقم من الأنبوبة مش من الجركن أو بيتادين.
4. stretch the penis with the non dominant hand
5. اقطع الكيس من تحت الاول
6. --كيس جمع البول يبقي distended
7. -شيل الغطا الازرق بتاع كيس جمع البول
8. -تدكك للاخر و تجيب بول بعدين تنفخ
9. -لو مش بتدكك احقن gelسرنجه 20 في الـ penis (e.g in BPH)
10. لو ماجبتش احقن 2سم بسرنجة الرايل علشان لو مقفوله بالجل

Leakage from urinary catheter :

- Neurogenic bladder : sofinasen 5-10mg /24 h
- In females :if there is leak حوالين القسطرة → replace it with smaller size

وتتنفخ علي اقل من اللي المفروض تتنفخ عليه ، يعني لو مركبة قسطرة عشرين و المفروض تتنفخ علي عشرين مللي هننفخها علي عشرة مللي و ممكن نركب قسطرة مقاس 16 او 18 .

- In male →larger catheter + انفخ البالونة

Bronchoscopy consider INR & platelets (normal)+chest tube,mahurker

1. فرش معقم→علي صدر العيان →ونحط عليهa)broncoscope + b)syringe الجقن
2. ينام Depeivan +katalar or dormicium according to Cr Cl &BP.ضغط و كلاوي
3. Ms.relaxant(tracium 1mg/kg double dose) with the the same precautions of MR p(91).
4. ETT suitable size to insert bronchoscope at easeجربها بره الاول +sterile gel (lubricant)
5. Corregated connection tubeعشان نعمل صليبه←مشرط (تشيلها بعد ما تخلص)
6. 2 saline bottles →

1- واحده تسحب منها السرنجات 2- التانيه تتأكد ان الشفاط شغال ومخرومه بمشرط كل مايخرج يشفط منها أوصله بجهاز وريد عشان أخد أول تشفيطة للمزرعة.

7. If +ve →repeat after 48 hours →if excessive secretions →±treacheostomy.
8. Check up to 3rd division تفضل تحقن و تشفط لحد ما تلاقي مايه نضيفه
9. Pulse oximetry بصوت عالي
10. PO2100% , volume controlled, pmax 100
11. Atropine /10 ml

12-بعد ما تخلص قعد العيان 45 درجة و اسمع صدر العيان ، المفروض لو bilateral equal ماتقلقش لو انت علي Fio2 عالي؛المية اللي انت حقنتها هتاخد وقت تـ resolve

هام جدا جدا :

لو العيان unstable وال peakكويس وال so2كويس ماتعملوش bronchoscope

13-الوان ال Bronchoscope

- Grey for pediatrics
- Green for teenagers(13-14 ys)
- Orange for adult

Indication of bronchoscope:

1- Bronchoalveolar lavage→ reservior توصلها بجهاز وريد و تاخد اللي فى ال

2-obstruction by (CT or Lung mechanics)

3 -blood clots during suction

4-unexplained machanics in intubated patient

5-unexplained failure of weaning in prolonged intubation

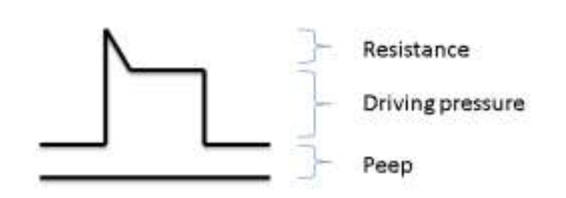
VENTILATION 1+2+11

P = PEEP + (V/C) + RF

P is peak pressure. P (   )

(V/C) is the difference between plateau & peep = driving pressure.

RF (Resistance x Flow) is the difference between peak & plateau = main airway resistance.



Indications of intubation (Inability to protect the airway)

1. Anesthesia.
2. Bulbar palsy + pneumonia. Ryle بصبر علي العيان شوية وأركب Pneumonia لو مش معايا Bulbar palsy عيان

   Early Tracheostomy & Gastrostomy ومش هيفك يبقي
3. GCS ≤ 8.
4. Continuous trickling, e.g, fracture nose,pan facial trauma →.after sometime larynx will be irritated,won't be able to protect airway

هام جدا5. Capacious secretions with inability to cough→elective intubation if so2 <85 % ممكن تجرب تشفط مره under vision بشروط الأنبوبة.

☞ In case of bilateral fracture mandible → consider awake tracheostomy.

Indications of ventilation . القرار مش سهل ويختلف باختلاف الظروف

1. Impaired mechanics: RR > 35 /minute.
2. Impaired oxygenation: PaO_2 < 60 mmHg on O_2 mask.
3. Impaired ventilation: $PaCO_2$ > 60 mmHg in non COPD patient.
4. ±Two risk factors

5.criteria of weaningعكس ال not indication for intubation, but it is clue if more than 2 systyms affected.

Initial settings of ventilation **_بنظبطها قبل ماتوصل العيان(11 items)_**

1-اول مالعيان ييجى بعد ماتتأكد ان الانبوبه والرايل فى مكانهم (ساعات بيجوا من الاقسام esophageal or endobronchialو طلّع الأنبوبة سِنة If diminished on lt side consider endobronchia

:ABC هتحطه مبدأيا على دول وبعدها تظبطها لما تخلص ال , suction with ambu &saline (closed valve)

11 **2**-initial settings : A) FIO2 100, TV 500 ideal (8ml/kg)in 70kg , RR 20 or 30 if acidotic , IE ratio 1:2, peep 5, pmax 100 & apply insiratoty pause 5-10 B) ARDS→1 2 3 4 6 8 10

في كل زرار فيتيلاتور بتسأل نفسك هو 1- مضبوط على إيه ؟؟ وليه؟, 2- وابص علي المربعات الصفرة عشان اتاكد انه مظبوط صح بص علي الاصفر و بعدين الاحمر

●1. **Mode**: weanable or not

A) Assisted controlled (volume or pressure) if not weanable

Volume controlled : preferred in

a)Bronchospasm B)bad compliance

c)pediadtrics with excessive secetion or multiple tube obstruction

Precautions should be taken in volume control :

1)increase P max (100)→pressure limit at which the ventilator doesn't pump volume

2)Apply inspiratory pause 5-10% →plateau pressure علشان يطلع →

لو مظهرش plateauارفع الinsp. Pause لـ 15-20 %

3) check peak airway pressure every 4 hrs if high →obstruction or restriction حل المشكلة

4)pneumothorax may be occurred (check it every 4 hrs)

لو الـ peak عالي و ملقتش حل ،اسمع صدر العيان كل 4 ساعات

B) CPAP : During 1- weaning or 2- intubated to protect the airway لو اتشق يتفصل فى نفس اليوم Monitor tidal volume & respiratory rate(PS will affect TV&RR)

e.g R.R= 25 Tv=300 PS=8 ....PS لو عايز تقلل الrate دوّر على أسباب RR↑ و زوّد فيه زراير :

- Pressure support :pressure is given to assist the patient to overcome the resistance of ETT and the connections
- PEEP
- Trigger (-2 ,-3 cm3)
- Peak=plateu

●2 **FiO_2:** initially 100% & keep your eyes on **SO_2** >**92%**

If hypoxic (↓PF ratio<300)→ ↓gradually by 10% every 15 min regarded that SO_2 > 92 %. ممكن أسرع من كده لو ناحية 98% انزل 20-20 لحد ما يقرب من 90 %

If not hypoxic >300 → ↓directly to 40%.

➢ High unnecessary FiO_2 is harmful (vent في ضهر ال compressor لو الهوا واقع لازم تشغل ال):

1-Blunt HPV →protective reflex

2- ↑oxygen free radicals

3- causes basal atelectasis.

so PEEP should be elevated first except in 1) bronchopleural fistula and 2) Rt side strain

⁎ if PEEP ↑ →Alveoli will distend →compress the capillaries →Rt side strain

- 3.**Tidal volume (volume mode) & inspiratory pressure (pressure mode)**

a- أنا ظابط كام acc. To ideal BW؟؟ b-هو بياخد كام ؟؟ c-أقل\ ازيه\ أكتر ؟ d- driving pressure, PH,CO2

e- permissive hypercarbia

A).**Tidal volume once ذُكر:** if VCV 5 items

- 8-6 ml/kg (ideal BW)
- 4-6ml/kg in : a)ARDS b) bronchpleural fistula c)Rt side strain d)surgical emphysema or emphysematous bullae e) rim of pneumothorax (conservative)

- apply inspiratory pause 5-10% to acquire plateau pressure and keep
  (1) the driving pressure <15 :

  if high→ decrease TV (up to 4ml/kg if still high ignore it) ±↑RR acc to ABG

  →alkalosis : xx ↑RR →normal or acidosis : ↑ RR

  then check ABG (PH& PCO2 and permissive hypercarbia is allowed or not in max.driving pressure & max. RR 25-35 ,

  Target co2: acc to type of patient as in

  a) aneurysm or hepatic or pregnancy & CKD →normocapnic

  b) ↑ICT or hyperkalemia→ hypocapnic

  c)COPD → normal PH

  2) driving pressure Never exceed 15 unless:

  a) you reach maximum RR (30-35 in adults) and

  b) permissive hypercarbia is contraindicated as if there is one af the following :

  1- DCL ($PCO_2 > 60$) 2- pH < 7.15

  3- Hemodynamic instability 4– Brain edema

In such cases hyperventilate by elevating the RR up to maximum before increasing the driving pressure to avoid its possible injurious effects (barotrauma & volutrauma).

- In ↑CO2 ,if on max RR & TV, check permissive hypercarbia allowed or not

  If not on max max , increase RR(35) then TV regarding driving &TV common with poor compliance eg.COVID

Driving pressure:

- In VC = Plateau - PEEP
- In PC = Peak – PEEP

Compliance: C =V/P normal =(50-70)

If the TV less than the setting TV check :

1) Pmax =Peak →limited inspiration → raise the Pmax

****the TV increases to the extent of the volume given →***

****the TV increases but not to the extent of the volume given → (combined)obstruction+leak***

2) Peak < Pmax → a-leakage or b- sensor

a)Leak →1) look for chest expansion + ABG

2)Humidifier + connections

3)cuff of(ETT or tracheostomy)

4) no nebulizers are attached

5) tracheostomy if (inner &outer as its international not built-in)

شيل ال inner و ال international بتاعتها وركب International بتاعة أنبوبة نفس المقاس

6) chest tube + air leak (bronchopleural fistula)

b) check sensor

If the TV more than the setting TV check:

1- trigger

2- nebulizer(increase FiO2& expired TV)

3-sensor with valve

NB: decrease peep & TV in case of emphysematous bulle

B).Inspiratory pressure : (*Peak * Above PEEP :driving)

if PCV (**TV given by this pressure** عيني علي),PH &CO2… تاني حاجة ابص عليها

if ↓ TV then there is ↓↓ compliance or obstruction

→VC اقلبه→اتاكد انه بياخد كويس و with the same precautions of volume control P(64)

In pressure mode: peak = plateau

●**4. Respiratory rate:** (actual / sitting ضابط كام وبياخد كام)

20 → modulate according to **pH & target** PCO_2 → e.g, in metabolic acidosis with max driving pressure , increase the RR up to maximum.

If not sufficient → ↑TV or driving pressure if pressure mode (injurious to the lung).

NB: if the patient is tachypnic and not synchronized →
may be insufficient sedation(central) or needs to adjust the setting of ventilator or others (management of lung pathology).

-if the patient is tachypnic i.e. taking more breaths than the ventilator setting→

if alkalotic : ↓RR by sedation + ttt of the cause

If acidotic :↑RR or TV if possible + ttt of the cause

●**5 IE ratio:** 1:2 &

(a)cycle time=60/RR خلى بالك من ال

Cycle time =2,insp. Time =0.8, exp. Time =1.2 يعني RR=30 ووصلت hypoxic or ARDS ⁎لو انا

(b) inspiratory time: 0.7 -1.2 (↑ I will improve the oxygenation .↑E will improve the ventilation not as anumber but never invert this ratio eg ; 1:1.5 if hypoxic or 1:2.5 if hypercarbic) ,

●**6. PEEP:** once ذُكر⬩5 items (a-P/F ratio b-compliance , c-Contraindicated بص علي دول الاول)

PEEP :↓VR

If **PF ratio** > 150 and< 300 → 8-12 (peep titration acc to compliance) ...

If PF ratio < 150 → 12 - 15 cmH_2O (peep titration acc to compliance).

(So PEEP 5 only accepted if PF ratio > 300) .

هام جدا◆d) Any patient on a) $FiO_2 > 40\%$ or

b)FiO_2 40% and $So_2 <99\% \rightarrow$ PEEP should be > 5 .

e)الحالة الوحيدة التي يُقبل فيها peep5, FiO2 40% So2 99% unless CI

هتتنفخ عشان عليت بالـ injurious الاول و علشان معرفتش ان الـ P/F ratio قليل

◆ In 3 conditions only, high PEEP is harmful & you should elevate the FiO_2 instead of high PEEP to maintain adequate oxygenation:

a- Broncho-pleural fistula (air leak فقاقيع هوا بتبقلل في الأنبوبة الصدرية): to allow healing.

b- -CVP or chest tube insertion(off temporary or decrease)

c- Right side pathology as pulmonary embolism or tension pneumothorax:

to avoid further increase in pulmonary vascular resistance that may lead to right sided HF,unless RV fuction was good with congestion(RV function is assessed by shortening of myocardial).

d- rim of pneumothorax conservative e-pnemomediastinum conservative

NB: ↓peep :

* transient :

*in CVL insertion *chest tube * CPR

*thoracotomy *ECHO

*Permenant:

* air leak *RT side dilatation

◆ In hypoxic patients → PEEP has to be > 5 even in hemodynamically instability

combliance عينك على ال

●7. **Pressure limit:** ليها صوت مميز

◆ Should be elevated in cases of CPR, bronchoscopy, frequent tube obstruction & severely hypercapnic COPD.

●8.**Humidifier** : 1-واصل 2-ومليان 3-وشغال 4-والوصلات مش غرقانه مايه

●9- Trigger :Volume (2L)

Pressure (-2,-3 cm3)

لو قليل : اى هزه فى الوصلات او مايه هيزود ال RR

ولوعالى :العيان مش هيحس به العيان فى ناحيه و هو فى ناحيه

●10- Bacterial filter esp in COVID patients

● 11. **Weaning** *once* *ذُكِر : 6 items 1- Criteria of weaning 2 - Simple or 3 - difficult 4- CI 5 - special cases 6 - most common causes of failure)* عينى عليها يوميا ولازم تعرف هو

➤ ***1- Criteria of weaning***

Non Respiratory	Respiratory
1. CNS: GCS > 8 **with** adequate cough reflex. 2. CVS: - Minimal dose of inotropes (<0.25mic/kg/min=6ml levo or 0.1mic/kg/min= 7ml adrenaline) - HR doesn't increase > 20% from baseline during weaning. **1.** GIT: not abdominal compartmental (IAP >20cmH2o) (check it tense or not and exclude the presence of pain). 4. Metabolic: absence of any of the following: - High(39-40) fever or severe hypothermia especially in pediatrics. - **Severe** metabolic acidosis - **Severe** anemia -Hypoglycemia - **Severe** electrolyte disturbance	1. PF ratio > 200 (if no available oximetry → p:76)So2 >90% on FiO2 30% 2. Rapid Shallow Breathing Index (RSBI): (during spontaneous breathing) Respiratory rate / tidal volume in liters e.g, RR: 20 with TV 600 ml → 20/0.6 = 33 > 105 → weaning will fail. 70- 105 → good chance for successful weaning. < 70 → higher chance of successful weaning. 3. Driving pressure compl.pr.=plateu-peep a)< 15 cmH_2O with adequate tidal b) volume > 4 ml/kg. 4. Minimal or no secretions هام. 5. Adequate cough reflex هام خصوصا عيان الجلطات أياً كانت درجة الوعي. 6. Create negative pressure > 20 cmH_2O . 7. PCO_2 < 60 in non COPD patients.

NB العكس غير صحيح بس بتدى فكرة عن حالة العيان

➤ In case of weaning on CPAP mode (والعيان مبيخدش نفس):

Off sedation & ms. Relaxation first for adequate time .

a) Increase apnea time up to 1 minute (to retain CO2→stimulation)+ صحصح العيان .

Or b) SIMV (Synchronized Intermittent Mechanical Ventilation)

with RR: 3 (stay next to patient for 15 minutes CPAPيلقط أو أرجعه) →

علشان لو سبته ومشيت هيجمع CO2 ويموت

➢ **_2- Simple Weaning :1- fitting criteria & 2-normal (PEEP 5 , PS 5 for 1/2hr then satsifactory ABG and extubate)_**

➢ **_3- Difficult weaning._**

☞ Patients with 1) failed weaning trial **or**

2) has one risk factor.(fitting criteria but not normal)

☞ How to wean: 1- Pressure support 5, PEEP 5 for ½-1 hour.

2- T-tube for 30 min.to 1 hour PS 0-3–3- CPAP or assisted control for 1 hour.

4 – Then extubate.

☞ If no T-tube available → pressure support 5, PEEP 5 for ½-1 hour → then pressure support 0-3(T tube ***بديل الـ***), PEEP 5 for 1 hour → then CPAP5-5 or assisted control for 1 hour → then extubate.

هام☞ Single weaning trial/24hrs **after intubation or after previous failure trial (simple or difficult)** اياك تديله فرصة تانيه + ***search for the cause of weaning failure eg hypophosphatemia &Sepsis are the most common causes***

➢ **_4- Contraindication of weaning :_**

A. حاجه مش موجوده فى الجدول اصلا

B. multiple risk factor (multiple system affection , fitting the criteria but not normal)

لو ال staff ***اصر :*** ***1-*** act as difficult (T- tube)

2-عينك عليه بزيادة..لو أنا لوحدى ألتزم بيها(ما تشيلش)

example: DCL 12/15 on levo 5ml /hr with weak cough reflex

NB: combind respiratory and metabolic acidosis is a risk factor

NB: T-tube has no PEEP or pressure support+ SE: basal atelectasis &no alarm of obstruction

➢ **_5 - Special cases_**

1)COPD patient :

hypercarbia is allowed till affecting PH , wean this patient immediately on CPAP mask

ممكن 10-10 ويتفصل مش لازم 5-5

2)Obese patient :

هو احسن واحد يخدم نفسه، 1-لو بيكح كويس و2- ***good motor power*** 3-حتي لو في الـ ***grey zone*** افصله

a) peep + recruitment ***بنج***

b)setting 90^0 on o2 mask , encourage him to cough with good motor power

3)Upper airway edema :

a)leak test (more than 10%)eg. volume 500 → volume 450

b)dexamethasone amp / 8 hr for 48 hr

c)Alphachemotrypsin amp IM /12 hr for 48 hr or maxillase

d)Adrenaline nebulizer has no role in intubated pt or wheezy chest.

4)cardiac patient :

Lasix before extubation

5)***accedintal extubation***

Algorithm of weaning a) difficult b) simple c) special types d)contra-indications ***يدخل***

NB: اى عيان طالع من العمليات بالانبوبه وانت رأيك انه ممكن يتفصل بس التخدير مافصلوش عامله معاملة ال ***difficult***

weaningوحطه على ***t tube*** جايز التخدير كان عنده حق مش هتخسر حاجه بس تبقى ***safe***احسن أو ***pressure support 3***

- ***6- The most common causes of weaning failure are :***

  a)Hypophosphatemia

  b)Sepsis

  c)consider bronchoscope.

in Bennet ventilator:

IE ratio depends on 1)flow 2)TV 3)RR (IE ratioال ای زرار هتغيره هيغير)

4) type of flow 5)inspiratory pause ,time inspiratory

لان كل زرار بيحدد حاجه معينه زى

1) Waveform (RAMP)→physiological (allows redistribution of air)

2)inspiratory pause (T_{pl}) 0.1

3) RR (to calculate cycle time) :acc to PH& target co2 &synchronization,

4) Flow + TV :a- TV acc to plateau, driving pressure , permissive hypercarbia

b-Flow (to calculate inspiratory time) eg F=30L/min =1/2L/sec. ,TV =500 so inspiratory time will be 1 sec

زيادة ال flowبتقلل ال inspiratory time

5) IE ratio from 3&4 (never invert the ratio)

1:1.5 →if hypoxic & 1:2→ if normal & 1:2.5 →if hypercapnic

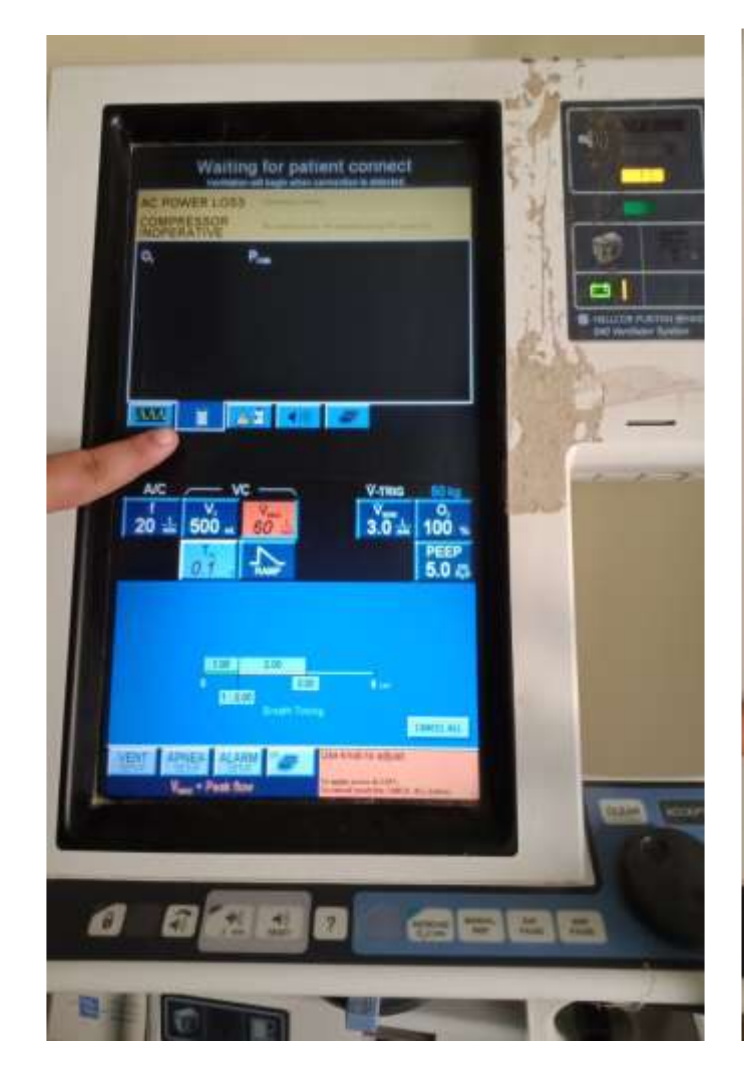
6) adjustment of Pmax from alarm setup

7) apply inspiratory pause(زرار على اليمين تدوسه بيظهر plataue فوق على اليمين)

8)difficult to use it with pediatrics

9)في زرار تحت في اقصي الشمال نظبطه علي 25 ←الا الـ COPDنظبطه علي 50

- ***لما تدوس الـ*** insp. Pause ***اضغط علي الجهاز و افتح شاشة الـ*** curves
- ***لما تلاقي الشاشة*** freeze ***دوس*** unfreeze ***من فوق***
- ***الـ*** compliance ***بنجيبه من الـ*** insp. Pause





NB: ازاى تحط انبوبه لعيان كوفيد ؟

- **Pre induction →CVL + Support (inotropes) +ventilator adjustment as ARDS + atropine +Adrenaline** *ازازة محلول عليها كالسيوم +جاهز جنبك*
- **Postintubation →prepare sedation (fentanyl +tracium +deprivan /katalar/dormicum)**
- *سقوط حر في عيانين الكوفيد خلال ساعات* ← **suspect PE** ←*لو الايكو مش متاح و انت في الطل ←أديله* **TPA**
- *عيانين الكوفيد بيتحطلهم أنبوبة من غير أدوية تنزل الضغط* ←**fent &succyninyl choline**
- **+0.5mg dormicum.**
- ***أقلبه*** assisted control ***الأول***
- ***أجهزل*** stocks ***قبل ما ينام***
- ***بعد الأنبوبة*** recruitment ***عالطول.***



Tube Insertion
علاقتك بالمونيتور: SO2علي BP immediate
تدعو بالستر
3 كبار و3 صغيرين
حتي لو ندهوك الانبوبة اتشالت
1-Full Stomach
a)1 - لو في وقت
- Mechanical decompression
- Chemical decompression
2- لو مفيش وقت
- Mechanical decompression
افتح الرايل وشفطها بسرنجة رايل
- If vomiting:
head down, lateral position
b)شفاط جاهز جنبك
c)Preoxygenation
d)Rapid sequence: Sux, Esmeron (1.2 mg/kg) ± cricoid pressure
2-Suspected Difficult Intubation
➤ Assistant. ➤ Equipments:
مناظير شغالة وبتنور و bladeمناسب وأنابيب بمقاسات مختلفة.
➤ Ambu bag (مفيش هوا من ورا) & mask.
➤ O_2 attached to the ambu bag.
➤ Ventilator ready & checked.
➤ preoxygenation
➤ Boogie & stylet (مدككش للاخر) ➤ LMA.
➤ Keep the tube sterile till insertion
حافظ على تعقيمها وانت بتحطها للعيان ...
هو مش ناقص يجيله pneumonia بسببك
➤ 1-ارفع السرير و2-ابعده عن الحيطه
➤ انبوبه دائره مقاس اصغر ← بمقاس
➤ Pulse oximeterبصوت عالى (هام)
➤ حد يدوس لك كويس : ازاي؟
4)±Smooth 5)±Cervical spine
6)Sputumاول تشفيطه تتبعت مزرعه
قسطرة تشفيط جديدة + كاب مزرعة جاهزين قبل الانبوبة
3-Liability For Hypotension
High sympathetic tone esp. in ICU patients
➤Before induction:
• لو صايمNormal ± 2 Ca gluconate (unless contraindicated)
• If severely toxic → حضر ليفو جنبك
• If on inotropes: elevate the dose before intubation.
➤ Induction:
• Very high sympathetic tone → once released:
العيان بيقع حتي مع أدوية غير الديبريفان زي الكتلار والفنت
جرعه صغيره من كل دوا معتمد على الكلى والضغط
(200 fent ,1/2 mg dormicum ,25-50 mg katalar ,3ml ephedrine ,3 ml deprivan)
• If borderline→ اسنده الأول e.g.: 120/80 → 160/80
➤الديبريفان عقار قاتل لو اضطريت تديه حل5 سم على 20 سم ملح وسقسقه وادي افدرين قبله (تت من كل تت).
• Muscle relaxant esp. neuro patients: dep., non-depolarizing
➤ After induction: Check BP immediately after tube fixation

وانت بتعمل preoxygenation تعمله على ال spontaneous mode or PS < 15 علشان ال cardia بتفتح عند 20 ولو بتعمله ب volume عينك على ال plataue علشان مايرجعش

Tube Exchange الله يسترك ويا رب أبوك يحج لو الـ **peak** عالى أول حاجة تعملها غير الأنبوبة

1. The same as tube insertion.
2. اعلى بـ FiO_2 لـ 100 %
3. أتأكد إنه بياخد volumes كويسة ... لو مبياخدش ارفع الـ pmax واقلبه volume controlled .
4. ادخل بالمنظار ***blade*** مناسب وهات view والأنبوبة اللي هتتشال لسه في مكانها
5. شفط كويس من الـ oropharynx ***و بعدين ترمي قسطرة التشفيط دي***
6. جهز قسطرة تانية معاك (مش واصله بالشفاط علشان تبقى اسهل تدخل بيها تشفط من ال ***view***) + مزرعة ***cup***
7. شيل الأنبوبة ودخل الأنبوبة الجديدة للآخر ← لو مدخلتش يبقى في distal obstruction p(73) ←***لو دخلت متوصلهاش على قسطرة تشفيط علشان ميحصلش*** **damage of mucosa** ، ***ثبتها واسمع*** Equality
8. انفخ الـ cuff ومتنساش تنزل بـ FiO_2
9. لو في excessive saliva ← ثبت ببلاستر الأول وتخشينة تحت الشاش

- لما تعلى بال ***pmax*** لازم كل 4 ساعات تبص على ال ***peak*** وتتأكد انه مش عالى وان مفيش ***pneumothorax*** وتصوره كل يوم وتكون ظابط ***inspiratory pause***
- لو الانبوبة اتشدت الافضل تـ ***ventilate*** العيان بـ ***ambu bag+open valve*** علشان الـ ***high pressure*** بتاع الـ ***vent*** ممكن يفتح الـ ***cardia*** و يعمل ***aspiration***
- Ventilate with PC or VC (max. pressure 20)

Tube Obstruction →a)***high peak or*** (b- ***tidal volume*** لما يقل الـ) اول حاجة تيجي في بالك

1. Exclude other causes of high peak (DD of hypoxia).
2. Ambu bag with saline (بعد قص الأنبوبة) → لو اتكرر → consider bronchoscopy.
   - Saline فى الظروف العادية بلاش Close the pressure releasing valve.
   - Make sure that the valve which is at the back of ambu bag is working.

   If peak is still high after ambubaging → consider tube exchange.
3. Fiberoptic bronchoscopy.
4. If fiberoptic is1) not available or in 2) critical patient →(هيموت) فى العيان اللي مينفعش يستنى حط أنبوبة مقاسها أصغر و ولفها ودخلها للاخر وصلها ع الشفاط واخرج بيها لو معدتش يبقى ***distal obstruction*** لو هتشفط من انبوبه او tracheostomy بلاش saline كتير فى الظروف العادية بلاش saline
5. Cardiothoracic: Rigid bronchoscopy

☞ <u>Signs of tube obstruction:</u>
- ↓ tidal volume
- ↑ peak airway pressure
- ↑ work of breathing
- قسطرة التشفيط مبتعديش للآخربعد ماتقص الانبوبه من فوق ال cuff

*لو ملقتش inspritory pause بتدوس علي procedures بتدوس علي inspiratory hold بيطلع Plateau

☞ DD of high peak

- Obstructed tube	- Pulmonary edema
- Endobronchial tube	- Pneumo/Hemothorax
- Bronchospasm	- Pleural effusion

Armored ETT are used in: extensive movement, shared airway & abnormal position.

Nasal ETT fixation length: 3-5 cm(pharynx) more than Oral ETT. لو في لعب كبير في المنطقة

Types of Endotracheal Tubes:

- According to material: PVC, Rubber, Metal.
- According to insertion: Nasal, Oral, Submental.
- According to cuff (high or low pressure cuff) : Cuffed, Uncuffed.
- According to lumen: Single, Double.

Intubation in full stomach:

- Rapid sequence induction.
- Awake fiberoptic intubation or awake tracheostomy.

Intubation in difficult airway:

- Inhalational induction.
- Awake fiberoptic intubation.

Intubation in full stomach with difficult airway:

- Awake fiberoptic intubation or awake tracheostomy.

Specific precautions for intubated | pediatrics (small ETT)

1. Suction every 2 hours بنفسك وتعمل جدول(الجروح وتقليب العيان) وتمضى عليه
2. Humidifier مليان و شغال
3. Bronchodilators (if wheezy).
4. Saline nebulizer
5. Solucortef شرطين if 1) wheezy 2)not responding to nebulizer.
6. If excessive secretion or repeated obstruction → change to volume control & elevate the pmax to avoid hypoventilation in case of tube obstruction with the same percutions of volume control p(63).
7. Tracheostomy: wash twice per day after day 6 .بنفسك
8. pulse الستاره ماتتشدش و جوانتي فى رجليه ملزوق عليه
9. تبص عليه بنفسك كل ساعتين.
10. X-ray حسب حالة صدره كل يوم أو اتنين
12. Spontanous breathing trial daily.

Excessive blood during suction :

ممكن INRواقع او platelets واقعة

1. If folley not available أو مش داخلة⇨rigid blunt catheter (less injrous)
2. Cyclokapron nebulizer (250 -500 mg /8 hrs) over 15 min nebulizer ±adrenaline .
3. Stop anticoagulant ±pneumatic cuff
4. Bronchoscope (regarding platelets & INR are normal. و ما تعملش حركة الانبوبة الا لو مٌجبر
5. Unequal left side طلع الانبوبة برة شوية و اسمعها تاني
6. (Ambu &Saline) طلع الأنبوبة و نفخ ب

NB INR & Platelets اشوف Ooze قبل ما اقول للجراح الجرح ب

Oxy-hemoglobin dissociation curve

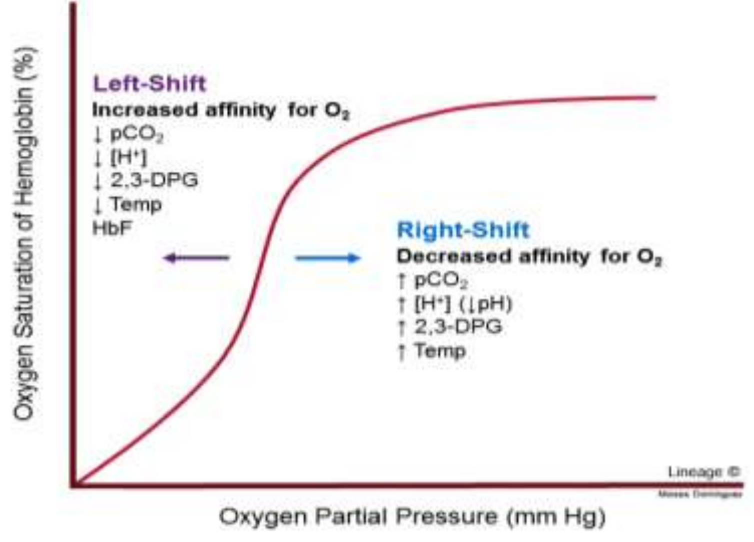
الهدف انك تعرف 3 fixed points علشان تحسب ال po2 فتقدر تحسب ال as arrange
P/f ratio as arange

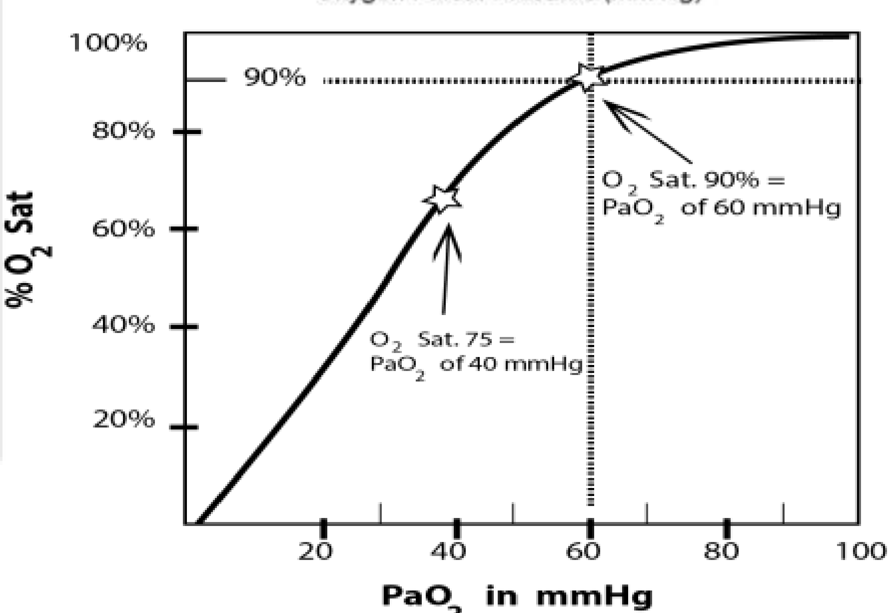
☜ الهدف من ال curve 1:فصل المريض بدون ABG , رغم ان ده مش صح اوي عن طريق ال p/f ratio prediction as a) arange OR b) ratio.

2:عدم سحب عينه arterial إلا للعيان الـ hypoxic .

3:Optimum peep: by P/f predicting as arange.

3points &4 ranges





- ♦ SO_2: 50% → PO_2: 27 (P50) = Arterial PO_2 at which 50% of Hb is oxygenated.
- ♦ SO_2: 70% → PO_2: 40 → = Mixed venous O2 tension.
- ♦ SO_2: 90% → PO_2: 60 = Least accepted SO_2 for discharge.

☞ e.g, If SO_2 is 80% on room air → so, PO_2 is between 40 & 60 → so, PF ratio is between 200 & 300.

No need for ABG sampling to assess oxygenation in the following conditions:

☞ If you set the FiO_2 on 0.4 & SO_2 is ≥ 90% → PO_2 is ≥ 60 → PF ratio > 60/0.4 = >150

هام☞ If you set the FiO_2 on 0.3 & SO_2 is ≥ 90% → PO_2 is ≥ 60 → PF ratio > 60/0.3 => 200 (≤peep 8)→ valid for weaning

☞ A patient on room air (FiO_2: 0.2) with SO_2 ≥ 90% → PO_2 is ≥ 60 → PF ratio > 60/0.2 ≥ 300

☞ weaning is suuccesful if po2 >55 on FIO2 30% peep 5 لازم و هام جدا

يعني لو هتفصل العيان من غير حاجة يبقي لازم تنزل بـ FiO2 :30% و يبقي الـ So2 >90 .

there are clinical predictors for CO_2, so in case of adequate :

Hypercarbia or failed mechanics

1) RR لو عالي
2)tidal volume لو قليل
,3) conscious level
4)increase BP
5) RSBI(rapid shallow breathing index) لو علي

→ most probably CO_2 is normal & no need for blood gases for extubation.

☞ Jaundice يصفر→ bilirubin ≥ 3

☞ Cyanosisيزرق → $SO_2 \leq 80\%$

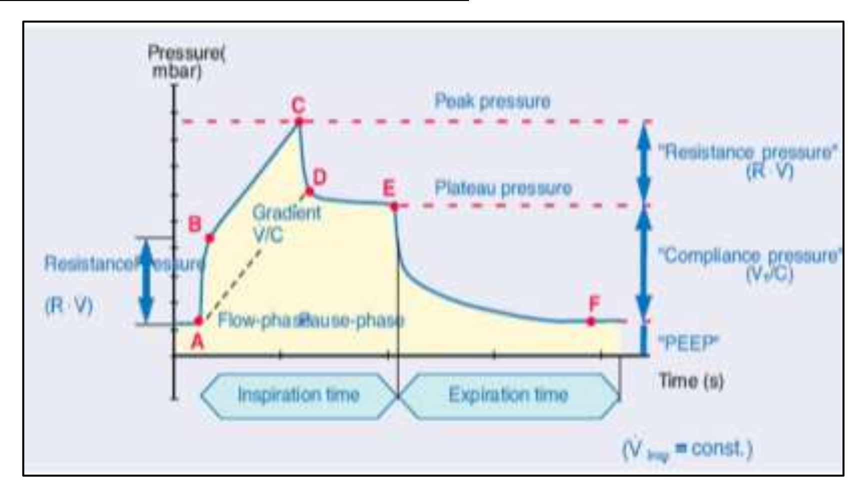
Ventilator Graphics

Curves: pressure, flow & volume against time.
Loops: flow-volume & pressure-volume loops (data interpretation).

Curves

1. Pressure-time curve

a) **Volume controlled ventilation:**



♦ compliance =ΔV/ΔP

♦ Resistance pr. = R x F → Change in volume & change in pressure .

♦driving pressure= plateau – PEEP

♦**A →→ B: Resistance of the airway** to air flow, so pressure increases dramatically since airways are unable to distend.
This pressure is present during air flow & absent during the inspiratory pause.

♦ **B →→ C:** Pressure created by **lung elastance** (1/compliance). Pressure increases gradually
since lung parenchyma is able to distend.

♦ **At point C**: No further flow as the ventilator delivered the set tidal volume, so pressure quickly falls to plateau pressure, the degree of fall equals the rise of pressure caused by the resistance at the beginning of inspiration... i.e, A → B = C → D = resistance pressure.

♦ **At point E**: Termination of inspiratory time, opening of expiratory valve & drop of pressure down to PEEP occurs.

☞ **Point C** refers to **Peak pressure = PEEP + V/C + Airway pressure**

Compliance = $\frac{\Delta \text{ volume}}{\Delta \text{ pressure}}$ → ΔPressure = $\frac{\Delta \text{ volume}}{\text{compliance}}$ → ΔPressure = $\frac{\text{Tidal volume}}{\text{compliance}}$

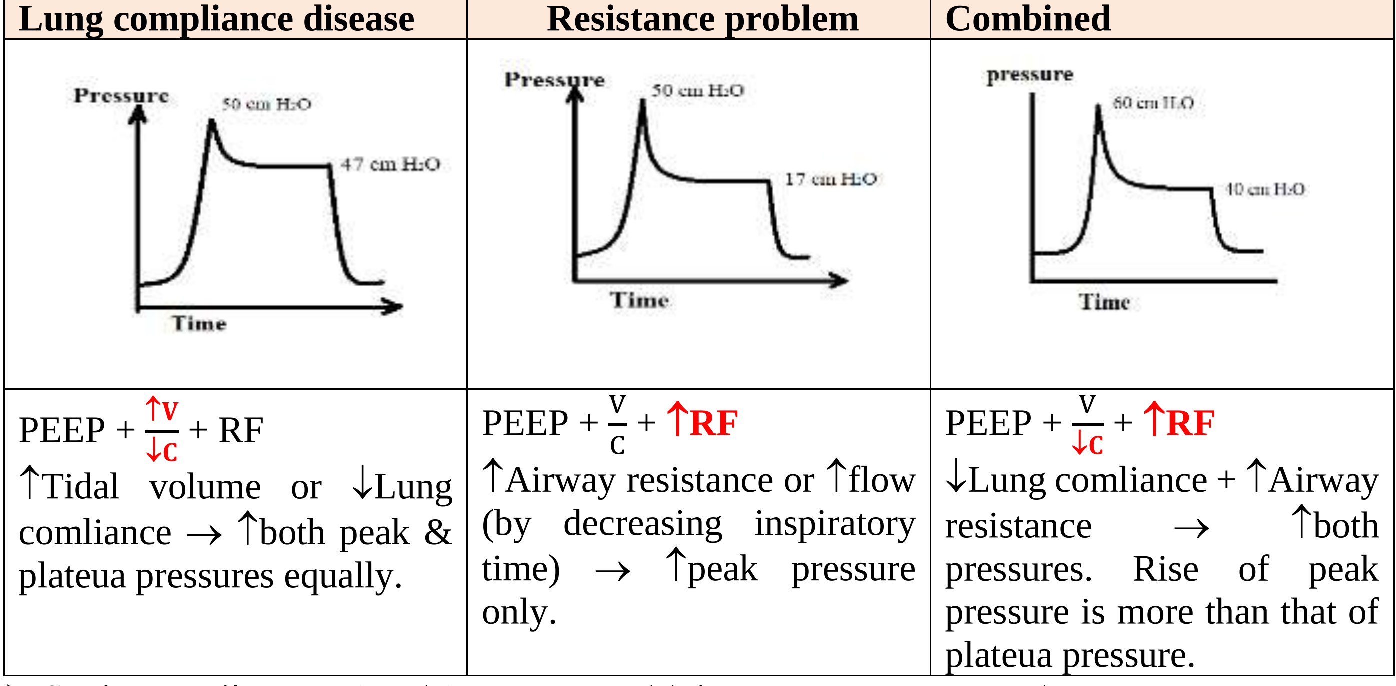
Δ Pressure = Plateau - PEEP, Δ Volume = Tidal volume → Pressure = V/C

Pressure = Resistance x Flow ... e.g, MAP = SVR x COP

Airway pressure = Airway Resistance (R) x Flow (F)

So: **Peak pressure = PEEP + $\frac{V}{C}$ + RF**

☞ Normally: Peak pressure - Plateau pressure ≤ 4 cmH_2O

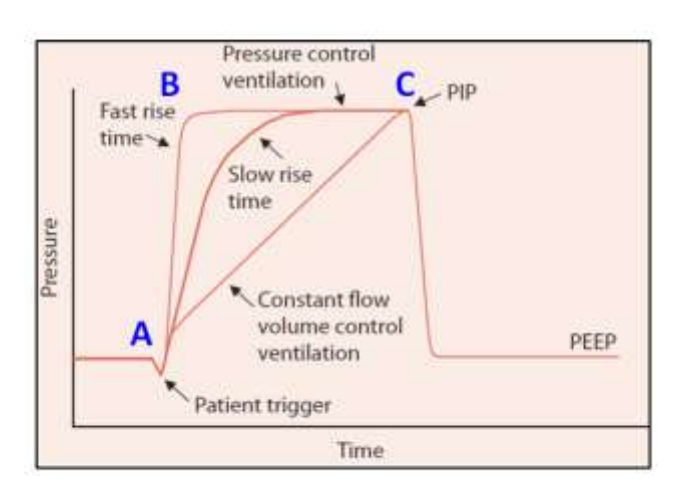


Lung compliance disease	Resistance problem	Combined
Pressure; 50 cm H_2O; 47 cm H_2O; Time	Pressure; 50 cm H_2O; 17 cm H_2O; Time	pressure; 60 cm H_2O; 40 cm H_2O; Time
PEEP + $\frac{\uparrow V}{\downarrow C}$ + RF ↑Tidal volume or ↓Lung comliance → ↑both peak & plateua pressures equally.	PEEP + $\frac{V}{C}$ + **↑RF** ↑Airway resistance or ↑flow (by decreasing inspiratory time) → ↑peak pressure only.	PEEP + $\frac{V}{\downarrow C}$ + **↑RF** ↓Lung comliance + ↑Airway resistance → ↑both pressures. Rise of peak pressure is more than that of plateua pressure.

- Static compliance = Δ V / Δ P →→ TV / (Plateau pressure – PEEP) 100-200
- Dynamic compliance = ΔV / Δ P →→ TV / (Peak pressure – PEEP) 50-70

	ICU ventilator	Anesthesia machine
Flow	Very high flow. No recycling of gases.	Low flow with recycling to preserve inhalational anesthetics & oxygen. Fresh gas flow can be reduced down to 250 ml/min (average O_2 consumption in adults) provided that no leak in the circuit.
CO_2 absorber	Absent	Present to get rid of CO_2 & thus, allow recycling of expired anesthetic gases.

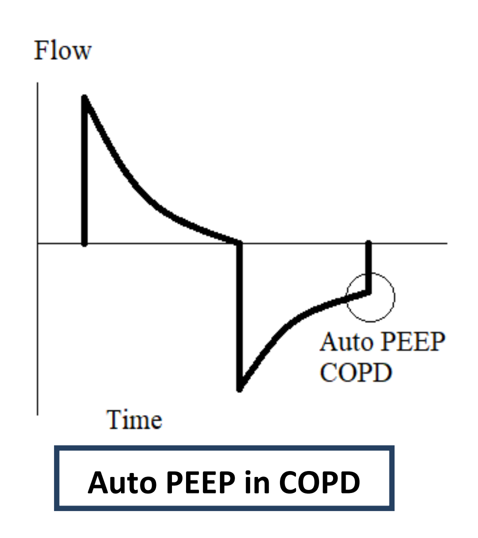
b) <u>Pressure controlled ventilation</u>



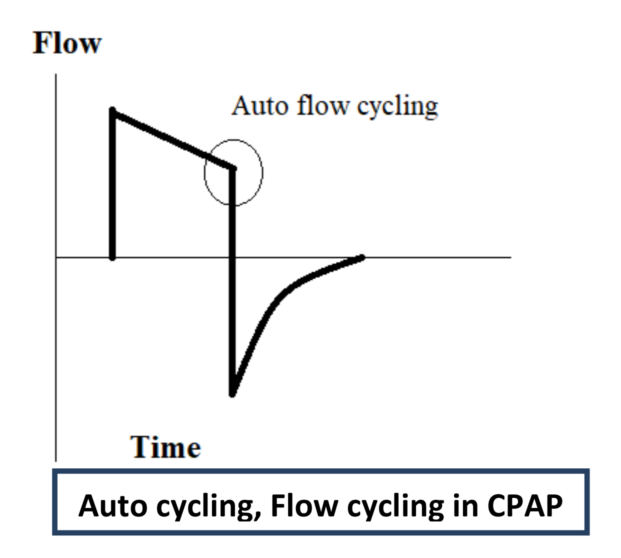
- ♦ At first, the ventilator delivers a volume to reach target pressure, so **from A to B** there is a sharp rise in pressure.
- ♦ **Point B:** Inspiratory pressure.
- ♦ **From B → C:** It is not a pause!! but the pressure doesn't rise or fall due to decelerating flow to maintain pressure inside the lung constant during inspiratory time.
- ♦ **At point C:** the expiratory valve opens & the pressure falls to PEEP and expiration begins.

2. Flow time curve

Volume controlled ventilation	Pressure controlled ventilation
♦ The flow during inspiration is constant. ♦ From D → E it is inspiratory pause. ♦ The flow during expiration is decelerating flow (passive expiration).	♦ The flow during inspiration is decelerating. ♦ The flow during expiration is decelerating flow (passive expiration).
Flow b c a d e g f Time	Flow b a c e d Time



Auto PEEP in COPD



Auto cycling, Flow cycling in CPAP

3. Volume time curve

[Volume controlled ventilation	Pressure controlled ventilation
♦ The flow during inspiration is constant. ♦ From D ---- E it is inspiratory pause. ♦ The flow during expiration is decelerating flow (passive expiration).	♦ The flow during inspiration is decelerating ♦ The flow during expiration is decelerating flow (passive expiration). ♦ Accelerating flow.
Volume pause Inspiratory time Expiratory time Time	Volume Insp. time Exp time Time

Mechanical ventilation

Classification :

Positive pressure versus negative pressure ventilation:

1. **Negative pressure ventilators :**
   Iron Lung: in the past used in the era of poliomyelitis & recently in patients with neuromuscular disorders.
   Disadvantages: patient handling, patient discomfort & no airway protection.
2. **Positive pressure ventilation**
   Gas is forced into the patient lung by mechanical means.
   This can be: invasive → ETT or non-invasive → CPAP mask (Face or Nasal)

Volume targeted VS Pressure limited ventilation

	Volume targeted ventilation	Pressure limited ventilation
Pressure	P. Peak P. Plateau	P. Plateau
Flow	Constant flow	Variable decelerating
Advantages	Guarantee ventilation	Limiting pressure Flow pattern allows better ventilation Patient satisfaction.
Disadvantages	Risk of barotrauma	Cannot guarantee ventilation

Breath variables	
Types of breaths	Trigger :what cause breath to begain
1. Mandatory } **controlled** 2. Assisted 3. Spontaneous	1. Patient: Flow triggering: 2 L/min Pressure triggering: -2 cmH_2O. 2. Mechanical ventilator (time triggering)
Limit (target) :what sustain	Cycling (end of inspiration)when to terminate
1. Volume in volume targeted ventilation . 2. Pressure in pressure targeted ventilation.	1. Time (inspiratory time) 2. Flow 3.volume: in VCV without inspiratory pause.

Ventilator parameters

1. Tidal volume (TV) → in volume modes and pressure controlled volume guaranteed
2. Inspiratory pressure (Pinsp) → in pressure modes
3. Respiratory rate (RR)
4. I:E ratio
5. Trigger (in assist control or spontaneous modes)
6. Pmax (Pressure limit)
7. Fraction of inspired oxygen (FiO_2)
8. PEEP

	Types of breaths	Trigger	TV	Pinsp	Pressure support	RR	I:E (insp. time)	Pmax	PEEP	FiO_2
VCV	Mandatory	-	√	--	--	√	√	√	√	√
PCV	Mandatory	-	--	√	--	√	√	--	√	√
assisted VCV	Mandatory & assisted	√	√	--	--	√	√	√	√	√
assisted PCV	Mandatory & assisted	√	--	√	--	√	√	--	√	√
SIMV-VC	Mandatory, assisted & spontaneous	√	√	--	√	√	√	√	√	√
SIMV-PC	Mandatory, assisted & spontaneous	√	--	√	√	√	√	--	√	√
CPAP	Spontaneous	√	--	--	√	--	--	--	√	√

➢ **<u>Pressure-controlled volume-guaranteed = pressure-regulated volume-controlled:</u>**

بيدي أول نفس بس volume controlled بالـ TV اللي مضبوط عليه ويقيس الـ plateau pressure بتاع النفس ده ... ويكمل pressure controlled بالـ plateau pressure اللي طلعله .

لو الـ compliance اتغيرت (e.g, CO_2 insufflation in laparoscopic surgery) ... الـ TV هيقل عن المضبوط عليه ... الجهاز هيبدأ يعلي الـ pressure اللي بيديه لحد ما يوصل لنفس الـ TV ... في Pmax لو الجهاز وصله مش بيزود pressure عنه وبيسيب الـ TV أقل من المضبوط عليه عشان ميحصلوش pneumothorax .

لو الـ compliance اتحسنت ... الـ TV هيزيد عن المضبوط عليه ... الجهاز هيبدأ يقلل الـ pressure اللي بيديه لحد ما يرجع الـ TV المضبوط عليه .

Dalton's law of partial pressure:

The total pressure of a mixture of gases is equal to the sum of the partial pressure of the individual constituent gases. i.e, P total = P1+P2+P3

***Oxygen cascade* in ambient air(RA 20%)**

❶ **PO_2 in ambient air:**

Ambient air pressure = 760 mmHg.

Oxygen = 0.21 of ambient air →→→ so: PO_2 = 0.21 x 760 = 160 mmHg.

❷ **PO_2 in nose & trachea:**

There is ambient air + saturated vapour pressure at 37^{O}c in nose & trachea.

So: PO_2 = (Ambient air pressure - saturated vapour pressure at 37^{O}c) x 0.21

Saturated vapour pressure 37 c = 50 mmHg.

So: PO_2 = (760 - 50) x 0.21 = 150 mmHg.

❸ **Alveolar oxygen tension** = PO_2 in trachea – (PCO_2 / Respiratory quotient)

While PCO_2 = 35 mmHg

RQ = CO_2 production per min / O_2 consumption per min = 200/250 = 0.8

So: Alveolar oxygen tension = 150 – (35/0.8) = 150 - 40 = 110 mmHg.

e.g. Co2 retension =150 – (80/0.8) = 150- 100 = 50 mmHg

→ 40 mmHg arterial→ So2:70

☞ CO_2 production is affected by some factors which subsequently affect the respiratory quotient such as:
- ⁎ Increased oral intake of carbohydrates → ↑CO_2 production → RQ = 1
- ⁎ Increased oral intake of proteins → ↓CO_2 production → RQ = 0.7

Co2 exchange 20 times more than O2 exchange to bypass alveolo-capillary membrane

Pulmonary end-capillary oxygen tension:

In practice, it is considered to be the same as alveolar oxygen tension provided that alveolo-capillary membrane is healthy = 110 mmHg.

❹ **Arterial oxygen tension (PaO_2)** = a) 102 – (age/3) or b) alveolar(110) – (age /4 +4)

e.g, in 30 years old patient → (PaO_2) = 102 – (30/3) = 92 mmHg.

(age/3) →basal atelectasis increase with advancing of age

Why 102 not 110? → because there are many factors affecting alveolo-capillary membrane or causing blood shunt without adequate gas exchange → increasing deoxygenated blood & decreasing arterial oxygen tension such as:

1. Bronchial drainage
2. Thebesian veins (venous drainage of the heart coronaries) } left atrium.
3. Basal atelectasis which increase with ag
4. Shunting

On different FIO2 , how to predict arterial o2 tension
Expected arterial O_2 tension (PaO_2) = FiO_2 x (4.5:5): (P/F 450-500)
e.g, if FiO_2 is 40% → so PaO_2 = 40 x (4.5 : 5) = 180 - 200 mmHg
If P/F (300-450) →Hypoxemia but not ARDS

❺ **Venous oxygen tension:** 40 mmHg

☞ Mixed venous saturation: obtained from pulmonary artery (SVC + IVC) → 70%

☞ Central venous saturation: obtained from CVL (SVC only) → 65%

☞ Anesthetised patients have a higher venous oxygen tension & subsequently higher venous saturation because they have low cerebral metabolic rate

Mixed venous > 70 %   Central venous > 65 %

Hypoxic pulmonary vasoconstriction (HPV)

Alveoli filled with secretion are poorly ventilated (hypoxic) → vasoconstriction.

- Shift blood flow to better oxygenated parts of the lung .
- The major stimulus is alveolar hypoxia, so increasing the FiO_2 → blunting of HPV → ↓ arterial O_2 tension.
- Every 10% increase above FiO_2 40% → ↓ expected arterial O_2 tension by 5-10 mmHg. e.g: 100% ----- 6 times increases by 10% above 40% = 6 x (5-10) = 30 - 60 below expected.

- Functional residual capacity = Residual volume + Expiratory Reserve Volume = 2500 ml
- Pre-oxygenation allows 10 minutes before desaturation as O_2 consumption is 250 ml /min
- After pre-oxygenation (de nitrogenation) of the patient then he exhales it ,the volume that remains in the lung is the functional residual capacity (2500ml)
- Knowing that O2 consumption /min is 250 ml →2500 ml will cover the patient for 10 minutes.
- Average rise of CO_2 in 1^{st} minute is 6 mmHg, then 4 mmHg every minute after.
- CO_2 after 10 minutes = 42 mmHg + already existing 30 = 72 mmHg.
- Proper ventilation for sufficient time after every failed trial of intubation .

Factors blunting HPV:

1. Hyperoxia, Hypocapnea & inhalational anesthetics **3 غازات**
2. Pulmonary hypertension & vasodilator agents.
3. Surgical trauma of pulmonary arteries.

Air bubble in blood gases sample:

According to the difference between the po2 in the blood and the po2 in air bubble :

Po2 in air bubble is 150 mmHg

We have three scenarios:

- First patient below 80 → no change in po2
- Second patient from 80 to 150 → po2 will increase ..serumمن الفقاعة لل
- Third patient above 150 →po2 will decrease ….للفقاعة serum من ال

NB ↑TLC,↑Plateltes ⇨↓PaO_2

Oxygen delivery :

A) Arterial O_2 content (CaO_2):

Cao2 = physical + chemical =(0.003×PaO2) + (Hb ×1.31×sat)

(Serum (الدايب في ال) (attached to Hb) =(0.003×100)+(15×1.31×1)=19.5(20) ml/dl

♦Every gram Hb carries 1.31 ml of O_2

B) Venous O_2 content (CvO_2)

= (0.003×40)+(15×1.31×0.75)=14.8(15) ml/dl blood

Arterio- venous O_2 difference =(CaO_2 – CvO_2) = 5ml/dl blood

♦ (0.7- 0.75) →70 -75 % sat.

C) O_2 consumption

= (arterial – venous) × CO (dl)= 5×50=250ml/min

(respiratory quotient RQ ,, preoxygenation)

D) O_2 delivery

=Cao2 ×CO(dl) = 20×50=1000mlO_2 / min

E) Extraction Fraction

= (arterial – venous) /arterial =5/20=25% of carried O_2

♦If O_2 demand > supply …….++ extraction & the reverse is true .

♦If O_2 delivery < 400ml/min →acidosis

♦400ml/min →40%of O_2 delivery →40% of calculated O_2 =40/100 x 15 =6 gm

♦At 6 gm Hb anaerobic metabolism occurs →acidosis →6 gm is the transfusion point in young adult fit

♦blood volume = 5 L = 5000 ml = 50 dL

Every dL = 20 ml O_2 content

ARDS

Berlin Definition

1)Acute 2)persistent hypoxia with 3) bilateral diffuse lung infiltrate (or unexplained secretions)→imaging 4)due to non-cardiogenic etiology.

1. Acute → within 7 days from the triggering factor, commonly in the first 3 days.
2. Persistent hypoxia → PO_2/FiO_2 → < 300.

   a)Mild: 200-300 b)Moderate: 100-200 c)Severe: < 100
3. Bilateral diffuse lung infiltrates in CXR.
4. Non-cardiogenic etiology → (normal Echo [contractility & values] + brain natri-uretic peptide).

± 5. Cause (pulmonary & extra palmonary)

Etiology

a) Pulmonary:

- ♦ Aspiration, pneumonia & lung contusion.

b) Extra-pulmonary:

- ♦ **Sepsis & Trauma** → the most common.
- ♦ **P**ancreatitis, purpura, burn, blood component transfusion eg: blood, plasma, platele .
- ♦ **C**ardiopulmonary bypass.
- ♦ **D**rugs: oxygen, cocaine, heroin.
- ♦ **E**mbolism:a) fat, b) amniotic, c)repetitive minor venous emboli from DVT.

NB: causes of tachypnea are the same causes of :1)ARDS and 2)respiratory alkalosis

Differential diagnosis of hypoxia 4items

1. **Chest auscultation:**
   - ★ Diminished unilateral: collapse - endobronchial tube - هواء - ميه - دم
   - ★ Diminished bilateral: obstructed tube, bronchospasm or pulmonary edema.
2. **Imaging:**
   - ♦ CXR or CT chest: may detect pneumonia, pneumothorax, ARDS or endobronchial tube.
   - ♦ Lung ultrasound: may detect – هوا(Pneumothorax), (effusion)ميه - دم, Congestion (cumulative balance) or consolidation.
3. **Echo:**
   - ♦ Right side: dilated in case of pulmonary embolism.
   - ♦ Left side: poor contractility is suggestive of heart failure & pulmonary edema.
4. **Numerics of ventilator:**
   - ♦ Check the peak airway pressure, plateau pressure & the tidal volume.
     - High peak with high plateau indicates decreased lung compliance.
     - High peak with normal plateau indicates obstruction (ETT or major airways).

   Peak pressure: depends on major airway resistance (ETT, trachea & bronchi).

   Plateau: depends on lung compliance.

➢ In case of pleural effusion: insert a chest tube → drain 500 ml/6hrs(to avoid sudden lung expansion & negative pressure pulmonary edema) & give lasix.

➢If you don't find areason , think about predisposing factor (revised Geneva criteria) of pulmonary embolism (minute)→ Do D-Dimer and follow the algorithm p(141) esp if mild hypoxia and tachypnea

If the complaint persists , Think about cardiac محتاجه متخصص or pulmonary cause ,and may be psychological or interstitial lung disease after excluding any organic cause

Clinical picture

- ♦ Clinical picture of the cause.
- ♦ Rapidly progressive respiratory distress (dyspnea & tachypnea).
- ♦ Early: hypoxia, late: hypoxia + hypercarbia.(muscle failure)
- ♦ ABG → acute severe hypoxemia.
- ♦ PFTs → restrictive pattern (poor compliance).due to fibrosis
- ♦ CXR → bilateral diffuse infiltration.
- ♦ Complications → DIC, ventricular arrhythmia or AKI.

Lung pathology : 1) Exudative phase(early) 2)fibrotic phase (late)

Prognosis

- Mortality: 30% either due to the primary cause or due to complications (MOSF).
(DIC ,AKI ,Arrhythmia)

Management

NB: (management of chest infection with hypoxia as ARDS (except specific TTT)+ TTT of chest infection p (93)

1) **ABC** (control of BP and saturation within 30 minutes with adequate blood gases & ventilator parameters).
2) **Definitive treatment: a)** pulmonary (1) if mild NIV (high flow nasal cannula) or CPAP mask
(2)if moderate or severe invasive (initial settings) & b)extrapulmonary 7 items.
3) **Treatment of cause:** e.g,infection p (99) flail chest: pain control ± fixation.
4) **Treatment of complications.**

Definitive treatment

b) Pulmonary

- Non-invasive: in mild cases :a) CPAP or b) high flow nasal cannula p100.
- Invasive (intubation): in severe hypoxemia p67.

a) Extra-pulmonary 7 items

1. **Solumedrol: (if septic shock and ARDS: soluocortef better than soluomedrol) high level of evidence**
   - Considered if PF ratio < 150 .
   - Loading: 1 mg/kg in the first hour → Then 1 mg/kg/day for 5-7 days shots or IV infusion Then 0.5 mg/kg/day for 5-7 days → Then 0.25 mg/kg/day for 5-7 days → Then 0.125 mg/kg/day for 3 days.

NB : Stability of solumedrol : 48 hrs بعد ما يتحل

2. **Liberal sedation up to muscle relaxation:**
   Tracium, see table below هام جدا جدا P95(0.5mg/kg bolus then 0.5mg/kg/hr)
   - Considered if PF ratio < 150 .
   - Done for 48 hours.
   - Should be started within 24-48 hours from the onset of ARDS.
3. **Negative balance ± diuretics.**
4. **Nitric oxide inhalation**:
   - Improve gas exchange at the alveolar level ,before reaching systemic circulation
   - Selective pulmonary vasodilator → it shifts blood from non-ventilated alveoli to ventilated ones. It is rapidly metabolized → so it acts on pulmonary vasculature only & doesn't reach systemic circulation.

5.Extra-corporeal membrane oxygenation (ECMO)

فى شريف مختار ببلاش او 200 الف جنيه

لازم ميكونش septic والسبب يكون reversible

6- Position

In ARDS & hypoxia-

a- sitting especially in obese patient 45◦-50◦(either mild ARDS or CI to prone)

b-Prone position unless contraindicated:1)high dose inotropes 2)pregnancy (relative) (sedated & relaxed) 3)cervical 4)abdominal surgery 5) morbid obese (lateral position)

Indication :

- Only if P/F ratio <100

- Duration : 16 hrs (start at 8 am ,ends at 12 am

و يتقلب علي ضهره بالليل و أنا نايم وقت ما ممكن يحصل مشاكل من الـ prone

When to stop prone position :

- until PF ratio >200 on peep 8 for 4 hrs, if you achieve this target no need to prone position .

- The main bulk of the lungs lies posteriorly → So, prone position provides better ventilation of larger portions of the lungs,↓VQ mismatch & improve lung compliance

NB if one lung is more healthy than the other one so, it should be dependant to minimize PQ mismatch.

7.Treatment of the cause.

To improve the oxygenation :

a) Ventilatory:

1. **Peep**
2. **Fio2**
3. **IE ratio→↑Inspiration (cycle time عينك على)**
4. **In case of hypercarbia →↑TV or RR (O2 cascade) هام جدا**

b) Non ventilatory:

5-prone position

6-Nitric oxide

7- ECMO

8-Physiotherapy

9- Out of bed

10- Spirometer

11- proper pain control

12- negative balance

13- TTT of infection p(76)

Pulmonary (ventilatory) management of ARDS

حفظ من تحت لفوق

Lung protective strategy

3 CO_2:

a) TV : **6 ml/kg**

b) Driving pressure < **30 cmH20.**

Driving pressure (plateau-Peep): **15 cmH2o.**

c) **Permissive hypercarbia** (provided max RR and Driving pressure) is accepted unless the patient developed: 1- DCL, 2-hemodynamic instability, 3- PH<7.15 → Stop strategy

2 O2:

a) Optimum peep depends on: 1-PFR 150-300, peep 8-12 if >150, 12-15 if <150, 2- Compliance as a curve (نيل طويل = peep علي), 3- **compliance as a number**, 4-الجداول , 5- Contraindications.

b) FIO2 < 60%

1 Liberal sedation up to muscle relaxation

Initial settings of ventilation

Non-Invasive

In mild cases (P/F 200-300) →

a) High flow nasal or

b) CPAP mask.

Invasive

10: Fio2: **100%**→↓ 10% every 10 min. as long as So2: 88-92%

8: PEEP: **8**-12 if PFR > 150 …. 12-15 if PFR <150

Consider (PFR and hemodynamics)

6: TV: **6** ml/kg because of poor compliance

If driving pressure > 15→ 5 ml/kg

If driving pressure > 15→ 4 ml/kg

❖ 7-8 ml/kg if plateau pressure < 25

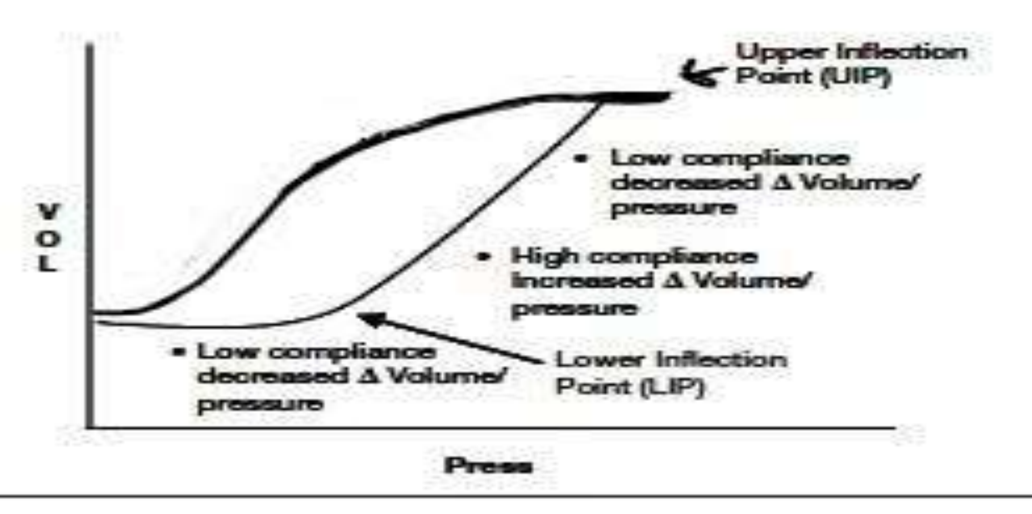
4: Assess every **4** hours. Monitor TV if pressure controlled. Monitor pressure if volume controlled.

3: RR: 30.. 25← **30** → 35 according to pH & Pco2.

2: IE ratio **1:2** (inspiratory time 0.7-1.2 secs) cycling.

1: Recruitment

Figure 12. Pressure-Volume Curve (P-V Curve)



Indications of muscle relaxation:

- ARDS with P/F ratio < 150, not well sedated .
- TBI with high ICP despite proper sedation (عيان مش مريح مع الفنتلاتور)+EEG.

if the patient convulses under sedation / ms relaxation won't be seen, علشان البورده متتحرقش

☞ **Considerations when using a muscle relaxant:**

1- The patient should be anesthetised (a-diprivan,b- katalar or c- dormicum) not just sedated with fentanyl acc to CRCL and BP

القصه كلها معتمده على ضغط وكلى

1-لو ضغطه يسمح يبقي diprivan ..2- لو ميسمحش والكلى كويسه يبقى dormicum

3-لو ميسمحش وعنده renal impairment يبقى katalar.. 4-لو katalar مش موجود ممكن تنيمه بـ diprivan وتسنده بليفو

2- Fully relaxed (not partial paralysis, i.e, no patient triggering)= full dose 0.5mg/kg/hr.

3- Start with a high respiratory rate , avoid respiratory acidosis .

4- Obtain blood gases 10 minutes after muscle relaxation to assess ventilation parameters & readjust them if needed.

☞ ***Ventilator-induced lung injury in ARDS***: 1-volutrauma, 2-barotrauma, 3-atelectrauma, 4-biotrauma & 5- oxygen toxicity → that minimized by lung protective strategy.

- بلاش tracium وانت قافل الـ ISO ←BP ↑

- كل ما الـ compliance curve يبقي واقف ، كل ما يبقي كويس

Recruitment	
Indications	Severe ARDS: P/F ratio < 150 … done in the first 3 days.
Contraindications	- Chest tube (pneumothorax) - Broncho-pleural fistula - Late ARDS > 5 days - Cardiac patient (severe hemodynamic instability&↑P in rt side e impaired function) -severe palm. HTN with impaired RV function. - Failure of previous recruitment اتاكد انه اتعمل اول مره صح زي الخطوات المكتوبه.
Preparation	- Arterial line + baseline ABG. - FiO_2: 100%. - Deep sedation & relaxation. - Normalize BP: if borderline → give fluids if fluid responder → inotropes (minimal dose) if non-responder
Pre-test	PEEP 15-20 for 15 minutes. Look at PO_2, SO_2, P/F ratio & oxygenation index. (mean airway pressure × FiO_2×100) / PO_2 If increased > 5% → recruitable.
Methods	♦ PEEP 40 for 40 seconds → بطلت بس بنستخدمها في العمليات ♦ Driving pressure 15 cmH_2O … 8 minutes divided into 4 steps.
Complications	- Pneumothorax - Hemodynamic instability

Duration	Driving pressure	I:E ratio	RR	FiO_2	PEEP
2 minutes	15	1 : 1	10	1	20
2 minutes	15	1 : 1	10	1	25
2 minutes	15	1 : 1	10	1	30
2 minutes	15	1 : 1	10	1	20

♦ Then: ABG → If PO_2 + PCO_2 > 400 → means that 95% of alveoli are opened = successful weaning.

♦ Calculate the optimum PEEP: (RR = 30, I:E =1:2 رجعه الاول)

انزل بالـ PEEP بمقدار 2 لمدة 3-5 دقائق واسحب ABG وشوف الـ PO_2 ← لو قل بمقدار أقل من 10% ←

انزل بالـ PEEP كمان 2 لمدة 3-5 دقائق وعيد الـ ABG ← لو الـ PO_2 قل بمقدار أكثر من 10% من اللي قبله

يبقى ده الـ Closing pressure ← اعلى فوقه بـ 2 وثبت على كده وهو ده الـ Optimum PEEP وليكن مثلاً

16 ... بعد كده عيد الأربع خطوات تاني وآخر PEEP في الخطوة الرابعة يبقى 16 مش 20

♦ Then: reset ventilation parameters back to ARDS ones

PEEP: 16 (optimum PEEP) I:E ratio 1:2 RR: 30 TV: 6 ml/kg

FiO_2: the least achieving SO_2 > 88%

Plateau pressure: < 30 cmH_2O

♦ Then: keep the patient on optimum PEEP till FiO_2 can be decreased to 40% with SO_2 > 88% →
then PEEP can be decreased together with solumedrol & negative balance.

♦ If ABG from the start showed that $PO_2 + PCO_2 < 400$ → repeat recruitment steps for 3 times → if failed → not recruitable → indicated for prone positioning.

COPD

♦ **Time constant:** Resistance x Compliance

♦ **Pathology in COPD:** ↑airway resistance due to chronic bronchitis & ↑compliance due to emphysema → ↑↑ time constant.

♦ **For complete expiration (avoiding air trapping):** expiratory time should be 3 time constant, i.e, COPD patient needs 1- long expiratory time for complete expiration or 2- ↑↑ PEEP..

Auto PEEP (air trapping)flow time curve

♦ **Ventilatory considerations:** **target : normalize PH not the Co2**

1- ↓inspiratory pressure or tidal volume.

2- ↓RR, 3-↓inspiratory time &4-↑expiratory time → to give a chance for proper expiration to antagonize internal PEEP & avoiding air trapping .5- optimum peep

♦ **If Acute severe asthma** : ↓ tidal volume , ↓low RR , ↑inspiratory flow & lung protective strategy.

♦ **If on CPAP:** ↓pressure support & ↑end flow 40-50%. In bennet 40%-60%

Cancelling Auto PEEP in COPD :

1- ↓ TV
2- ↑ PEEP (optimize)
3- ↑ Exp. Time
4- External compression of the chest

Ventilator Associated Pneumonia

☞A type of Hospital Acquired Pneumonia that developed more 48 hrs to 7 days after endotracheal intubation.

➢Diagnosis

a)Clinical 1-fever ≥38.3 2-purulent sputum

4-Decline in oxygenation or ↑O2 requirement

5-focal abnormal lung auscultation

6-sepsis or septic shock and NO other source.

b)Radiological

1-CXR 2-CT chest 3-lung U/S

c)**Laboratory**

1-leuckocytosis≥12000 or leukopenia≤4000 /mml 2-sputum culture 3-blood culture.

d)**Consider bronchoscopy**

How To Present

→see ventilator care bundle.

→Use non-invasive positive pressure

Treatment

1-No risk of MDR start Monotherapy e.g. tavanic,invanz & B-lactam

2-Risk of MDR cover MRSA+MDR gram -ve bacteria.

NB Both inhaled & systemic antibiotic rather than systemic antibiotic alone eg. Colistin.

Chest disease

♦A) Infection B) contusion C) congestion D) flial chest,chest trauma. E)Hypoxia±ARDS

TTT of chest infection = ARDS – specific ttt of ARDS (solumedrol ,N2O, ECMO) + Position + antibiotics

♦ **Consider the following:**

1- according to the patient(ventilated or not)

a)if not ventilated: 1) Oxygen mask or nasal cannula 2)CPAP mask 3) high flow nasal cannula حسب العيان

b) if ventilated: adjust the setting of ventilator as p (63) ,If the patient ARDS adjust the ventilator setting as P(90)

2. Negative balance , give lasix unless بيجيب بول لوحده or severely dehydrated ±aldactone .
3. Physiotherapy & out of bed. حتي لو 1- العيان متضايق و2- التمريض متضايق و 3-الدكتور متضايق.
4. Spirometer(triflow) as atype of physiotherapy .

مقلوب ينفخ و معدول يشفط ويسيب الكور معلقة.+ اتأكد بنفسك انه بيعمله كل ساعتين (هام)+حزام بطن ±جوانتيات ينفخها لو مفيش

5. Humidifier ± saline nebulizer ± expectorant.

±6. Bronchodilators if wheezy or pediatric with excessive secretion or wheezes.

أي حاجة غير الفاركولين اتأكد إنها موجودة في علبة العلاج وبتتاخد لأن المريض بيشتريها , ولو ينفع فاركولين بس يبقي أحسن الا لو ممنوع زى 1-arrhythmia &2- tachycardia &3- hypokalemia

- لو مفيش nebulizerيبقي بخاخه

±7. Steroids: a-Solumedrol 125 mg/ 8 hrs if :1-wheezy

2- not responding to Bronchodilators.

b- Decadron in case of croup. و يقف لو العيان فك

NB : Stability of solumedrol : 48 hrs بعد ما يتحل

±8 in status or severe bronchospasm not responding to steroids →adrenaline infusion 1mg / 50 ml rate 1-2 ml/hr±katalar shots or infusion ± MgSO4 (IV &nebulizer) ±Aminophylline , No Adrenaline nebulizer

±9. Antibiotics & cultures (if salivary sample or poor cough → suction under vision facilitated by sedation for once → if accumulates secretions → consider intubation).

10.pain control. (if there is fracture rib →1-epidural or 2-morphine infusion not shot)

Epidural infusion :12.5 cm plain Marcain 0.5 + amp. Fentanyl و يكملوا لـ 50 سم = 1/8 Makin + 2mic fentanyl / ml →Bolus 6-8 ml then infusion rate 5-10 ml/hr

- NB: BP عينيك علي
- It blocks autonomic, sensory not motor power
- In aortic patient don't activate epidural before declamping

In case of excessive expectoration(sputum)with free chest imaging → suspect tracheobronchitis

☞ In a young child during arrest with no IV access →give adrenaline endotracheal in CPR

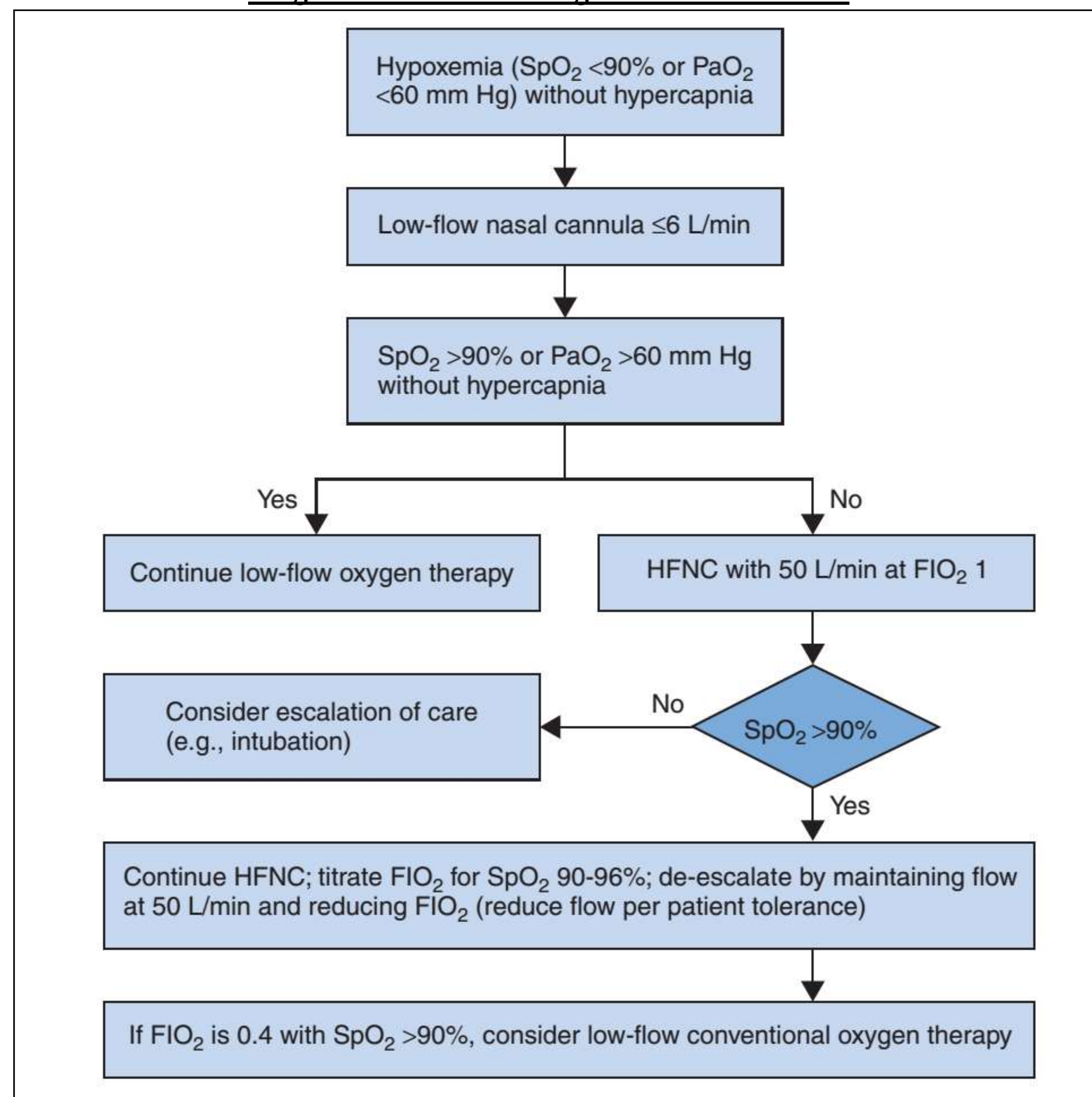
OXYGEN THERAPY

(The aim is to know FIO2&flow (if variable كام لتر) to calculate P/f كرقم if ABG available or ratio depending on O2 curve

Device	Liters (flow) مهم	Fio2 (imp to calculate PF ratio=po2/fio2)	Uses & specific notes
1.O2 Mask : A. Open mask (variable flow)	6L/min	24%	↑ 1L more than 6L →↑3%Fio2
B.Venturi (fixed flow)		Fixed fio2 up to 60%	• علي حسب الالوان اللي متوصلة بيها • كل لون انبوبه Fio2معين كل لون مكتوب عليه رقمين 1-رقم بيمثل Fio2 2-والرقم التاني علي كام لتر
C.Non rebreathing or partial rebreathing with reservoir bag		80-100%	
2.low flow nasal cannula (variable flow)	0.5-6L/min	24-40%	Advantage:Talk & eat &disadvantage: nasal dryness and crusts
3.High flow nasal cannula with humidifier ➢ 2knobs : 1. Fio2 2. Flow.. لازم يتحول لPEEP ➢ Humidifier	20-100 L/min	20-100%	-Uses -COPD - mild ARDS -Pulm. edema Chest trauma -10L/min→1.3mmH2o e.g.60L/min →1.3 x 6 =7.8 PEEP(100l→13peep) -ROX index in pneumonia:So2/fio2÷RR ROX index >4.8→successful ttt
4.CPAP mask: Mask has no bores →used in the icu ventilator with 2 limbs Mode must be on →non invasive ventilation.			-Uses : -COVID19 • COPD& Mild ARDS • Chest trauma • Acute Pulm. Edema • Obst. Sleep apnea • Laryngeal spasm
Home devices بيكون مخرم			
1.CPAP device: Mask has bores →used at home with single limb(PEEP only).			-Uses: • Obst. Sleep apnea • تكلفته 15 الف جنيه
2.BIPAP device : With single limb & its mask has bores.(PEEP & PS)			جهاز منزلي بيناسب → in COPD عليه المريض تكلفته 25 الف جنيه +COVID pt
3.oxygenator	5,8 &10 L/min		In hypoxic COPD patient غالي و له عدد ساعات شغل معينه
4.O2cylinder flowmeter لازم يكون ليها			يحتاج2 تتملي من الاسعاف كذا مره و تأجيرها يحتاج البطاقة و 100 جنيه

NB High flow nasal canula better than non- invasiveacyc

Diagram for the use of high flow nasal cannula



-

BLOOD GASES

pH "power of hydrogen"

- It is the negative log of H^+ ions to the power 10 .
- Why to the power of 10? → because H^+ concentration = 40 nano Eq/L "small number"

  so, power of 10 → readable.

  pH = pka + log base\acid = 6.1 + log $HCO_3^- \setminus PCO_2$ … if PCO_2 in mmHg × 0.03

  pKa :PH at which any substance is half ionized ,half non –ionized

☞HCO3 prediction not estimation

Normal values

PH: 7.4 ± 0.04 PCO_2: 40 ± 4 mmHg PO_2: 102 - $(\frac{Age}{3})$ on room air

HCO_3: 24 ± 2 mEq/L(standared) 110-(age/4 +4)

لان ده بيتحسب من الجهاز ومش بيتأثر بال co2

Lactate: < 2 mEq/L Chloride: 100 ± 5 mEq/L مينفعش تستنجه

Anion gap: 12-18 mEq

Death occurs at pH less than 6.8 or more than 7.8 due to enzymatic dysfunction.

Compensatory mechanisms

1. **Buffers**

   1- HCO_3^- pka: 6.1 ± 1 (5.1-7.1) → so it is more effective at pH (6.8-7.1)

   2- Hemoglobin 3- Proteins 4- Others

2. **Respiratory another use of oxygen cascade**

   - Takes one hour from metabolic acidosis "tachypnea" (kausmel breathing).
   - Takes one hour from metabolic alkalosis "bradypnea".
   - Respiratory compensation is more effective in **metabolic acidosis**.
   - In case of alkalosis → bradypnea, hypercarbia, hypoxia occur → affect oxygen cascade stimulate breathing.
   - ↑PCO_2 by 1 mmHg → ↑ minute ventilation by 1 liter.

3. **Renal**

   - Takes one day(acute) to start with maximum effect after 3 days(chronic).
   - It includes : a) Reabsorption of HCO_3^-

     b) Excretion of titratable acids

     c) Formation of ammonia

Components of blood gases

1. Oxygenation & ventilation → comment on PF ratio if a) FiO_2 is mentioned & b)arterial sample , range او اعلق عليها في صورة.
2. Metabolic component
3. Electrolytes & Hb "if caliberated" compare ḗ serum electrolytes ḗ every new cartilage.(calibrated زيه زي الكيمياء)1:0.5 لو مش calibratedممكن تفرق
4. Anion gap, Base excess.(BE)
5. Glucose
6. Lactate

☜ كل item في ABG بيكلف حوالي 50 جنيه في البرايفت ... لو سحبت ABG كاملة بتكلف حوالي 500 جنيه !!! فمتعملش أكثر من واحدة للعيان إلا لو في indication 4 على اقصى تقدير بس ضروري لو متخيط كذا واحد في اليوم على فترات كل 8 ساعات.

Compensation	***تتحرك في نفس الاتجاه***
Respiratory نزول السلم اسرع	Metabolic acidosis: e.g p104 Expected ↓CO_2 → 1.2 x △ HCO_3^- ideal - actual Metabolic alkalosis: e.g p107 Expected ↑CO_2 → 0.7 x △ HCO_3^- الكبير –الصغير ونقارن العيان بالمتوقع actual – ideal (24 ± 2)
Metabolic	Respiratory acidosis : Expected ↑HCO_3^- : e.g. p108 1day Acute: 1 for each 10 mmHg increase in CO_2 . 3day Chronic: 4 for each 10 mmHg increase in CO_2 . Respiratory alkalosis : Expected ↓HCO_3^- : e.g.p109 Acute: 2 for each 10 mmHg decrease in CO_2 . Chronic: 5 for each 10 mmHg decrease in CO_2 .

Effects of acid-base disturbance on different organs

	Acidosis	**Alkalosis**
CNS	- Cerebral vasodilatation.(↑P) - CNS depression .	- Cerebral vasoconstriction. - CNS excitation.
Respiratory	- Bronchodilatation. - Shift of oxyhemoglobin dissociation curve to the right. - Vasoconstriction of bronchial vessels - Respiratory center stimulation.	- Bronchoconstriction. - Shift of oxyhemoglobin dissociation curve to the left. - Vasodilatation of bronchial vessels. - Respiratory center depression .
CVS	- PCO_2: 60-80 → stimulation - Early stimulation due to release of catecholamines ↑CO→↑perfusion. PCO_2: > 80 → depression - Late depression due to: 1. Vasomotor center inhibition, 2. myocardial depression & 3. Vasodilatation of vessels.	- Arrhythmias due to hypokalemia & ↓ ionized calcium.
Electrolytes	↑K^+ & ↑ionized calcium. **NB:**↓ pH by 0.1 → ↑serum K^+ by 0.6 mEq/L هام جدااا	↓K^+ & ↓ionized calcium.

Early acidosis →shift O2 dissocition to the Rt & ↑co2

Blood gases abnormalities

Blood gases Interpretation

1-Arterial or venous,
2-P/F ratio if arterial,
3- pH
4-pCO2
5-HCO3
6-Compensation
7-Anion gap or corrected anion gap & gap-gap ratio,
8-Most probably
9-Others

Metabolic alkalosis

Chloride sensitive:,
ميه خارجه →Diuretics
اكل خارج
→1)Vomiting & nasogastric drainageفوق
→2)Chloride diarrhea تحت

Chloride resistant :
Hypokalemia, Conn's, Cushing $

Miscellaneous: Bicarbonate, Milk alkali $

Respiratory alkalosis

Central:
1. Meningitis
2. Hysterical
3. Salicylates (early)
4. Hemorrhage
5. Pain

Lung :
1. Early pulmonary edema
2. Minute pulmonary embolism
3. Pneumonia
4. Pleurisy

Blood:
1. Anemia
2. Sepsis (early)
3. Fever

Misc.:
1. Ascites
2. Pregnancy
3. Inadeq. ventilation parameters

Respiratory acidosis

Increased production:

a) Exogenous:
CO_2 insufflation مناظير, TPN (High CHO content), Bicarb.

b) Endogenous:
1-Tourniquet release,
2- Malignant hyperthermia (Sux),
3-Fever
4.Neuroleptic malignant syndrome (anti-psychotic drugs) (CK, CKMB) prognostic كل ما يبقي علي
5- Thyroid storm.

Decreased elimination = Hypoventilation. (2 x 2)
1. Obstructive: upper / lower
2. Restrictive: Neuromuscular diseases/ ↓ Compliance
3. جهاز بايظ
4. دكتور تايه

Metabolic acidosis

High anion gab:

Exogenous:
Methanol, Ethanol & Salicylates (late).

Endogenous:

Increased production:
Ketoacidosis (DKA),b) Lactic acidosis (1-sepsis,2- Metformin, 3-Starvation & 4-Hypoperfusion).

Decreased excretion:
Acute & Chronic renal failure

Normal anion gab:
1- أكل خارج→ Ileostomy & diarrhea, pancreatic fistula
2- أكل داخل→ TPN: Panamen contains high chloride content (alternative Aminolepan or aminsteril)
3- ميه داخلة→ Infusion of large volume of saline >3 L,
4- ميه خارجة→
a)Carbonic anhydrase inhibitor (Acetazolamide): used in glaucoma and benign ↑ICP
b) Renal tubular acidosis Uretero-enterostomy,
c) Ileal conduit (absorption of chloride from urine)

Metabolic acidosis

simple ➢ ↓pH, ↓PCO_2 , ↓HCO_3^-

➢ Respiratory compensation (△ PCO_2) = 1.2 x △ HCO_3^-

e.g, HCO_3: 14 → So: △ HCO_3 = 10

Expected ↓CO_2 = 1.2 x 10 = 12 → 40-12 = 28 mmHg

➢ If the cause of metabolic acidosis is unclear → 1- calculate the anion gap & 2- corrected anion gap & 3- gap to gap ratio to detect : a) type b) cause c) TTT .

1)Anion gap(لازم يبقى فيه كلورايد علشان تحسبها ماتفترضوش ابدا)

respiratory or metabolic (تتحسب لكل العيانين سواء)

- Used to determine if metabolic acidosis is due to accumulation of acids (high anion gap) as in DKA or loss of bicarb (normal anion gap) as in diarrhea

الانسان لا يلتصق بالمغناطيس لانه Neutral

- Measured cation (Na)+ unmeasured cation(k,ca,Mg) =

measured anion (Cl + HCO_3)+ unmeasured anion(P,PO4,Plasma ptn albumin)→→→

Na – (Cl + HCO_3) = UA – UC

The anion gap (AG) = Na – (Cl + HCO_3)

لذلك اى عيان acidosis مش واضح السبب لازم تسحب CL عشان احسب ال anion gap

- Normal AG = 12 ± 4 , High >16-18
- ↓ Albumin by 1 gm/dl → ↓ anion gap by 2.5 → So: calculate the corrected AG →→→

2)Corrected AG = AG + [2.5 X (4.5 – albumin in g/dL)].

هام جدا: عيانين كتير بنحسبهم normal بيطلعوا missed high ومعظم عيانين الرعايه بيبقوا hpoalbuminemia

3)Gap-gap Ratio

لمعرفة هل يوجد اكثر من سبب لل acidosis

- AG Excess/HCO_3 Deficit = $\frac{AG-12}{24-HCO3}$
- If metabolic acidosis is due to excess acids only (high AG) → the increase of AG will be equivalent to the decrease of HCO_3 → So, the Gap-Gap ratio will be 1-2.
- If metabolic acidosis is due to excess acids plus loss of bicarb eg diahrea,renal failure (high & normal AG)→the decrease in HCO_3 will be greater than the increase in AG → the gap-gap ratio will be < 1.
- In case of co-existence of high AG metabolic acidosis with metabolic alkalosis (nasogastric drainage or diuretics) → the decrease in HCO3 will be less than the increase in AG→ the gap-gap ratio will be > 2.

➢ **Types of metabolic acidosis:** *Acid(H) + bicarb (HCO_3)→H_2O + CO_2

1. **High anion gap metabolic acidosis asRes. acidosis**: it occurs as a result of excess acids (addition of acids):
   a) **Exogenous:** methanol, ethanol & salicylates (late).
   b) **Endogenous(resp acidosis نفس عناوين ال:)**
   - ☞ **Increased production:** a) ketoacidosis (DKA), b) lactic acidosis (1-sepsis, 2- metformin, 3-starvation & 4-hypoperfusion).
   - ☞ **Decreased excretion:** acute & chronic renal failure.

   The most common cause of metabolic acidosis is renal impairment.

2. **Normal anion gap metabolic acidosis (Hyperchloremic metabolic acidosis):**

It occurs as a result of loss of bicarb which is balanced by increased renal reabsorption of chloride ions to maintain electrical charge neutrality.

☞ **Causes:**

1-أكل خارج → Ileostomy & diarrhea,pancreatic fistula

2-أكل داخل → TPN: panamin contains high chloride content (alternative amino lipan or aminsteril)

3-مية داخلة → Infusion of large volume of saline >3 L,

4-مية خارجة →

a) Carbonic anhydrase inhibitor (Acetazolamide): used in glaucoma and benign ↑ICP

b) Renal tubular acidosis Uretero-enterostomy,

c) ileal conduit (absorption of chloride from urine)

الوحيد N.B, Acetazolamide(cidamex) is the only cause of acidosis with hypokalemia (in glaucoma & benign ↑ICP&CSF leak).→blood gases + potassium

➢ **Clinical picture**: clinical picture of the cause + effects of acidosis on different organs.

➢ **Treatment**:

1. ABC.
2. Treatment of the cause
3. If PH < 7.1 → correct HCO_3^-: ⅓ deficit x body weight → then half correction Or ⅓ base excess x body weight.

Then repeat the ABG

Eg: PH 7 , HCO3 12 →deficit 24-12 =12 →1/3x12x100Kg=400

★ Base excess:

- Amount of acid or alkali to be added to blood at 1- temperature 37°c &2- normal oxygen saturation to normalize the pH.
- If -ve → acidosis, if +ve → alkalosis
- Normally it is - 2 to + 2 mEq/L
- Metabolic alkalosis > +2 , Metabolic acidosis < -2

★ Dose of HCO_3^- in pediatrics → 1-2 mEq/kg. (DC 1-2 J /kg)

★ Wait before giving HCO_3^- :

1 - Mild acidosis is useful → effect on organs (see before) beneficial effect O2 dissociation curve shifted to Rt eg:CO

2 - NaHCO3: in neonates →1) hypernatremia &2) ICH.

in adults → ↑CO_2 →1) delay the weaning &2) intracellular acidosis.

3- Give $NaHCO_3$ when pH is < 7.1

or < 6.9 or7 in DKA as it is responds rapidly to fluids & insulin.

4 - If renal cause → dialysis is indicated + Anti hyperkalemic measures لحين تجهيز الغسيل

5 -Dialysis is not effective in lactic acidosis.

☞ Carbicarb(NaHco3بديل)→ has no side effects but not available in Egypt.

Metabolic alkalosis

Simple ➢ ↑pH, ↑PCO_2 , ↑HCO_3^-

➢ Respiratory compensation (△ PCO_2) = 0.7 x △ HCO_3^-

e.g, HCO_3: 34 → So: △ HCO_3 = 10

Expected ↑PCO_2 = 0.7 x 10 = 7 → So, PCO_2 = 40 + 7 = 47 mmHg

➢ **Causes:**

1)Chloride Sensitive "Urine chloride < 15 mEq/L"	2)Chloride Resistant "Urine chloride > 20 mEq/L"	3)Miscellaneous
ميه خارجه →Diuretics اكل خارج →1)Vomiting & nasogastric drainageفوق →2)Chloride diarrhea تحت	البوتاسيوم و هرموناته (gluco&mineralocorticoids) - Hypokalemia قرايتين - Conn's & Cushing syndromes (cortisone cause 1- salt &2- water retension/3- K &4- H excretion)	Bicarbonate Milk alkali syndrome

N.B : The most common cause of chronic hypokalemia is hypomagnesemia(k&mg)

لازم التصليحه تبقى بوتاسيوم وماغنسيوم هام جدا (5 K + 1 Mg , rate 20 ml /hr)

- **Clinical picture**: clinical picture of the cause + effects of alkalosis on different organs.
- **Treatment**:
  1. ABC.
  2. Treatment of the cause.
  3. If chloride sensitive → ⅓ deficit of chloride x body weight.
     Deficit = 100 – actual   e.g. if deficit = 300 →100 ml saline .
     eg:- if the equation results is 157 = 1 liter of normal saline.
     If pH > 7.6 and the patient is not responding to treatment (cause & electrolytes)
     (simple metabolic) → dialysis.

Corticosteroids :

- K & H excretion, salt and water retention .
- Glucose ,CHO ,protein ,fat .

Respiratory acidosis

simple➢ ↓pH, ↑PCO_2 , ↑HCO_3^-

e.g, Expected ↑HCO_3:

Acute cases: 1 for each 10 mmHg increase in PCO_2 as in Asthma
e.g, PCO_2 is 50 → increase in PCO_2 is 1 ten →
expected increase in HCO_3 is 1 → 25

Chronic cases: 4 for each 10 mmHg increase in PCO_2 as in COPD
e.g, PCO_2 is 50 → increase in PCO_2 is 1 ten →
expected increase in HCO_3 is 4 → 28

- **Causes**:

1. Increased production: as high anion gab في العناوين

a♦ Exogenous: CO_2 insufflation مناظير -TPN (High CHO content) -Bicarb.

b ♦ Endogenous:

1-Tourniquet release,
2- malignant hyperthermia (sux),
3-fever
4.Neuroleptic malignant syndrome (anti-psychotic drugs)(ck,ckmb)
prognostic كل ما يبقي عالي
5- thyroid storm.

2. Decreased elimination = Hypoventilation. 2 x 2

a) **Obstructive** : Upper airway: foreign body & laryngeal spasm.
Lower airway: COPD & bronchospasm.

b) **Restrictive**: (neuromascular & compliance)

- **Neuromuscular diseases: من فوق لتحت**

من المخ ↓ للعضلات ↓ وتألف

- Central: Hemorrhage, tumor, trauma & drugs
- Spinal cord: Trauma
- Ganglion: Poliomyelitis
- Nerve: Neuropathy
- Neuromuscular junction: Myasthenia
- Muscle: Myopathy

- **↓ Compliance: الرئه و ما حولها**

- Lung: interstitial pulmonary fibrosis & pulmonary edema (late)

ما حولها:
- Pleura: pleural effusion & pneumothorax
- Thoracic wall: kyphoscoliosis
- Soft tissue: morbid obesity (Pickwickian syndrome)

c) **جهاز بايظ**: CO_2 rebreathing : exhausted soda lime or valve malfunction.

d) **دكتور تايه**: Inadequate ventilation parameters.

لو نيم طفل وبعده حالة adult ونسى يعدل الـ ventilation parameters

- **Clinical picture**: clinical picture of the cause + effects of acidosis on different organs.
- **Treatment**:
  1. ABC, including CPAP mask & ventilation
  2. Treatment of the cause * COPD → low flow oxygens قليل SO2.

حتي لو ال SO2 قليل حبتين (89-92%)ماتعليش الـ flowهام جدا جدا جدا جدا

Respiratory alkalosis

simple ➢ ↑pH, ↓PCO_2 , ↓HCO_3^-

➢ **Causes**:

1)Central	2)Lung	3)Blood الوصله بينهم(central&lung)	4)Miscellaneous
1-Meningitis 2-Hysterical 3-Salicylates (early) 4-Hemorrhage 5-pain	1-Early pulmonary edema (CO2 washing) 2-Minute pulmonary embolism 3-Pneumonia (early) 4-Pleurisy	1-Anemia 2-Sepsis (early) 3-Fever	1-Ascites 2-Pregnancy 3-Inadequate ventilation parameters = دكتور تايه

- **Clinical picture**: clinical picture of the cause + effects of alkalosis on different organs.
- **Treatment**: 1. ABC. 2. Treatment of the cause.

Interpretation of blood gases (9points as ventilatoior) | **_هام جدا جدا يتبص عليهم بالترتيب_**

A) gas exchange

1. Arterial or venous: compare with monitor saturation

متقدرش تحكم من غيرمونيتور

لو مفيش مونيتور العيان بيزرق عند 80% SO_2 .

لو فى ABG نفس قراية المونيتور تبقى arterial هام جدا

2. If arterial → assess the PF ratio (PO_2/FiO_2)
   - 1-احسبها رقم من ال ABG
   - 2-لو من المونيتور Range

B) Acid base

3. pH
4. PCO_2
5. HCO_3

4 & 5 → compensation — لو مابيتحركوش فى اتجاه واحد ماتحسبش

*(لو واحد فيهم طبيعى او بيتحركوا عكس بعض)

± 6. Compensation

7. a) Anion gap= Na-(Cl+HCO3) (in case of metabolic acidosis) or b) corrected anion gap (common e low albumina) & gap/gap ratio .

8. Possible causes of abnormalities one or more هام جدا.

9. Others: electrolytes, hemoglobin, lactate and RBS (if calibrated, cartilage لازم تتأكد مع كل).

13 Variables with 13 possibilities& 9 Diagnosis.

1. High pH → alkalosis

+ High PCO_2 + High HCO_3^- → Simple metabolic alkalosis.
+ Normal PCO_2 + High HCO_3^- → Combined metabolic & respiratory alkalosis.
+ Low PCO_2 + Low HCO_3^- → Simple respiratory alkalosis.(Acute or Chronic)
+ Low PCO_2 + Normal **or** High HCO_3^- → Combined respiratory & metabolic alkalosis.

2. Low pH → acidosis

+ High PCO_2 + High HCO_3^- → Simple respiratory acidosis.
+ High PCO_2 + Normal **or** Low HCO_3^- → Combined respiratory & metabolic acidosis.
+ Normal PCO_2 + Low HCO_3^- → Combined metabolic & respiratory acidosis.
+ Low PCO_2 + Low HCO_3^- → Simple metabolic acidosis

(compensation , corrected anion gap & gap to gap).

3. Normal pH

+ Normal PCO_2 + Normal HCO_3^- → Normal blood gases.

+ Low PCO_2 + Low HCO_3^- → Combined respiratory alkalosis & metabolic acidosis.

The dominant pathology is the one to which the pH is closer.

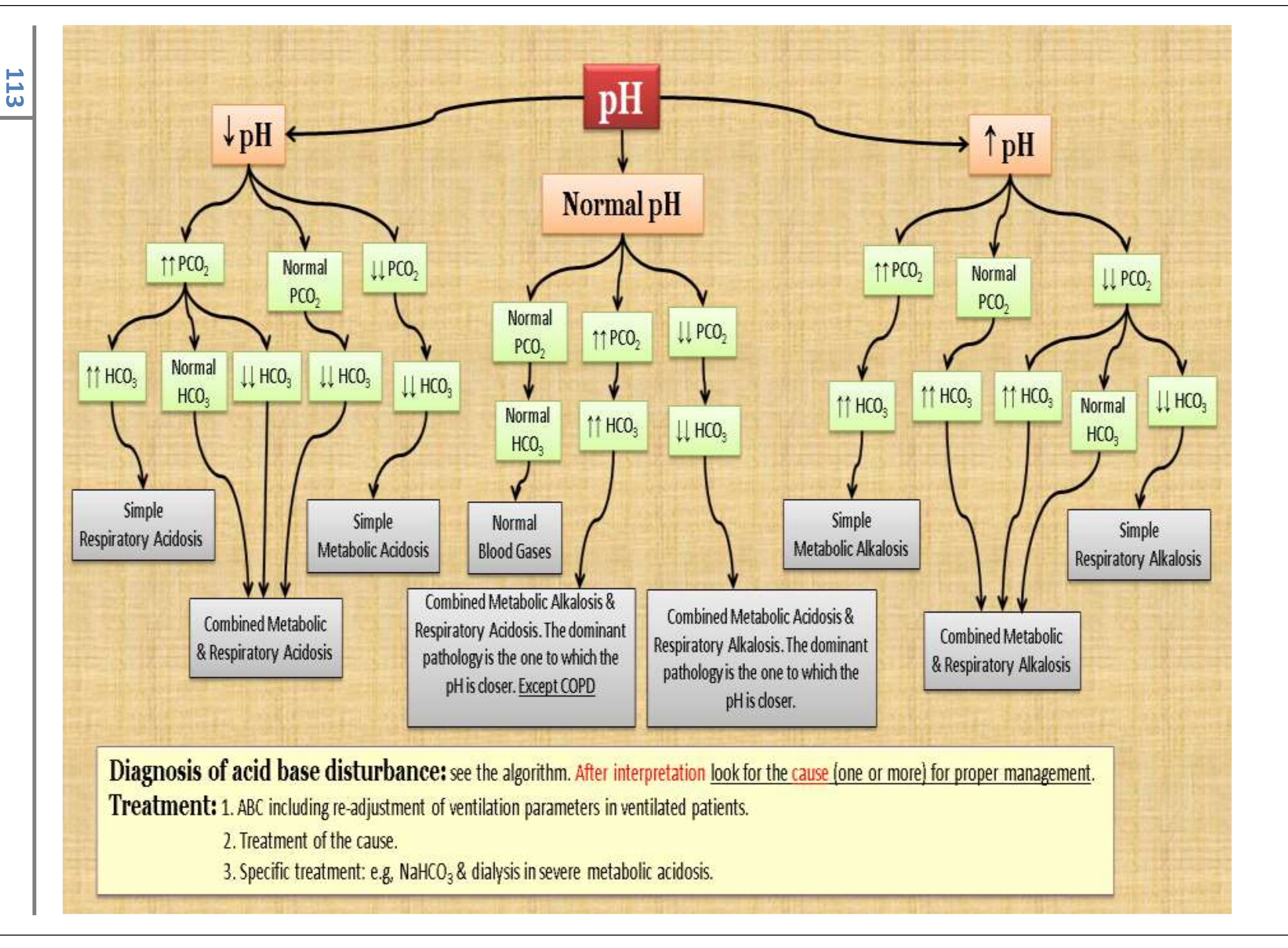
For example, if the pH is 7.36 → so, the acidotic component is the dominant pathology.

+ High PCO_2 + High HCO_3^- → Combined respiratory acidosis & metabolic alkalosis.

The dominant pathology is the one to which the pH is closer.except in COPD compensation

☞ Compensation does not completely correct the change in pH produced by the primary acid-base disorder except in chronic respiratory acidosis(COPD)& chronic respiratory alkalosis .

☜ لو في الامتحان ذكر الـ FiO_2 يبقى لازم تعلق على P/F ratio . لو مذكرهاش غالبا عايز تعليق على الـ acid base compensation .


pH
↓pH
Normal pH
↑pH
↑↑ PCO_2
Normal PCO_2
↓↓ PCO_2
↑↑ HCO_3
Normal HCO_3
↓↓ HCO_3
↓↓ HCO_3
↓↓ HCO_3
Simple Respiratory Acidosis
Combined Metabolic & Respiratory Acidosis
Simple Metabolic Acidosis
Normal PCO_2
↑↑ PCO_2
↓↓ PCO_2
Normal HCO_3
↑↑ HCO_3
↓↓ HCO_3
Normal Blood Gases
Combined Metabolic Alkalosis & Respiratory Acidosis. The dominant pathology is the one to which the pH is closer. Except COPD
Combined Metabolic Acidosis & Respiratory Alkalosis. The dominant pathology is the one to which the pH is closer.
↑↑ PCO_2
Normal PCO_2
↓↓ PCO_2
↑↑ HCO_3
↑↑ HCO_3
↑↑ HCO_3
Normal HCO_3
↓↓ HCO_3
Simple Metabolic Alkalosis
Combined Metabolic & Respiratory Alkalosis
Simple Respiratory Alkalosis
Diagnosis of acid base disturbance: see the algorithm. After interpretation look for the cause (one or more) for proper management.
Treatment: 1. ABC including re-adjustment of ventilation parameters in ventilated patients.
2. Treatment of the cause.
3. Specific treatment: e.g. $NaHCO_3$ & dialysis in severe metabolic acidosis.

SHOCK   *TISSUE HYPOPERFUSSION NOT HYPOTENSION*

Differential diagnosis

Diagnosis by a) clinical (H/O ,Examination ,investigation).

b) ECHO& Images can 1-confirm diagnosis (that was clinically detected) and 2-

2-detect other causes مش دايماَ واضح.

From the most common to the least:

1-Distributive (Sepsis) then2- cardiogenic and 3-hypovolemic then 4-obstructive

ممكن تبقى اكتر من واحده مع بعض وممكن

main pathology initiate or exaggerates the other causes eg Toxic cardiomyopathy due to sepsis e.g pt with P.E in ct angio. →sudden unstable (DD of shock Not Streptokinase)

1. **Hypovolemic** =evident volume loss by clinical H/O (bleeding ,burn,diabetic coma,starvation ,..) ,Symptoms &sign.(hypovolemic shock commonly associated with sepsis)

*العيان الكبير في السن بيبقي drowsy حركته قلت ،ما بقاش يأكل ..ما تقلش dehydration،ده أكيد فيه Sepsis

*غالبا ال pure hypovolemic بيبقى بسبب bleeding

2. Cardiogenic: impaired cardiac output due to (a-impaired contractility or b-Rhythm) diagnosed by assessing CO using VTI(velocity time interval م.م) even with poor contractility ,Good contractility = non cardiogenic for follow up esp with +ve cardiac enz. Provided rhythm is controlled.

Poor contractility a)VTI لو فى حد يقيس b) مفيش يبقي element cardiogenic

3. Obstructive: pulmonary embolism , pneumothorax & cardiac tamponade by , ECHO& lung us xray –CT confirm the diagnosis.

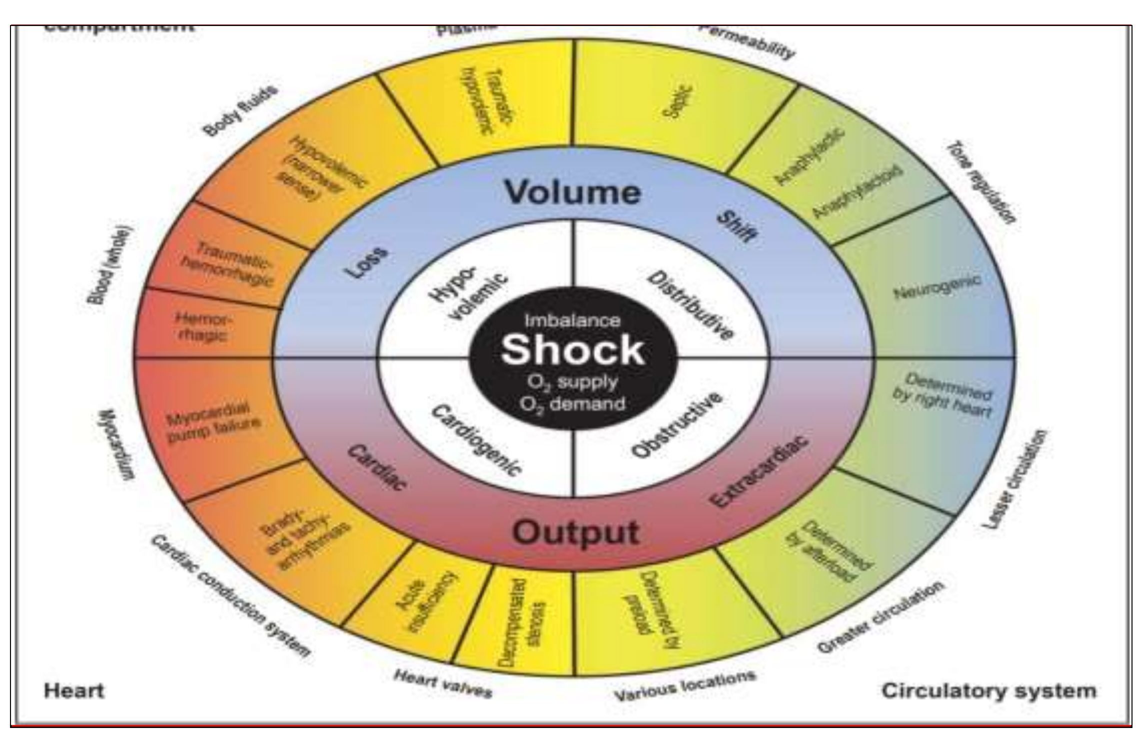
4. Distributive:(a-**Sepsis** (most common cause of shock), b-anaphylactic&c- neurogenic d- end organ failure eg:portal vein thrombosis→Responder or not according to1- dynamic if available or2- static and 3-clinical.

N.B: Endocrinal as myxedema(cardiogenic) & addisonian crisis(distributive)..

💣💣Resuscitation of bleeding & pediatric shock should be done in the golden hour as Dilatation of capillary bed after prolonged hypotension is irreversible

When to do differential diagnosis of shock

1. Shock on admission. 2. Shock while in ICU. 3. Marked ↑vasopressor dose بتعلى .



☞ Consider possibility of multifactorial etiology.

1. **Volume assessment (in shock & AKI&tachycardia&burn)** → Excluded by a)static , b)dynamic measures, c)clinical H/O &examination صدّق العليل →(لو عايز محاليل hypovolemic or distributive responder) esp. if burn , high output , restricted fluid

assessment of cumulative balance ولو عيان قديم لازم

a) **Static measures:** *Dynamic is most accurate

♦ CVP → (NB هم تلاتة و واحدة معاها)

Not accurate but the most available (the most common used).

a) if increased 5-7 cmH2o after 500 ml or 200 ml in special cases (restricted fluid)

b) If you reach the target CVP , +8mmHg=12cmH2o in non ventilated & +12mmHg=16cmH2o in ventilated or

c) fluids 30ml/kg ***unless*** CIأقلها or continuous loss أعلي →

*stop fluids if 1-B lines 2-hypoxic 3-basal crepitations and depend on inotropes (frequent check so2 and B lines in lung U/S and auscultation of crepitation)

(HR ,BP , Na)NBالعيان الفاتح بول وفايق بيشرب ,مش لازم تعوض الخسارة لو دول كويسين

☞Early :resuscitate

☞late:cumulative balance + dynamic +clinical أبص على

How to measure CVP?

1- the patient should be flat , if CI assess with the trend
2- Isotonic solution :ringer or NS.
3- Backflow
4 – المسطرة zero at the level of mid axillary
5- Measure using a ruler or roughly ابقي عارف كف ايدي و شبري قد أية
6- lumen لوحده مش معاه محلول

NB: if > 7 cmH2o أعلي بالمسطرة هينزل الlevel لو الlevel اترفع تاني لنفس الرقم تبقي صح

- In case of bleeding :Hb /2-4 hrs if drop continue resuscitationعلشان اللى بتديه بيخره.

♦ Others → PAWP, RVEDV & LVEDV.

b) **Dynamic measures**: most accurate (volume &Responsiveness)

N.B Fluid Responsiveness: does not mean that apatient should be given fluids.

- It means patients are on the ascending portion of their starling curve and the stroke volume and COP will improve if fluids are given
- In patients with AKI or shocked on ascending portion of their starling curve →give fluids to confirm adequate volume status in AkI and to improve COP in shocked patient till become no responder.
- مش لازم اى عيان يكونresponder hypovolemic علشان ممكن يبقى

a- distributive responder or b- normal patient for post operative monitoring→

don't give fluids if he is stable ، عيان كويس و HR كويس

Tools to know fluid responsiveness± inotropes from the start max. max.نص ساعة ماسك ضغط أو

****In septic shock , the patient should receive at least 1 -1.5 liters of fluids if not resuscitated before or esp. if you don't have dynamic measures unless there is limitation(DD of shock بسرعة)***

200ml x 200 ml
In special situations
عشان خايف يبقللوا

1-hypoxic(p/f ratio <150)
2-cardiac a)severe stenotic valve or b)poor contractilithy <40% ,
3- anuric (CRF / AKI)

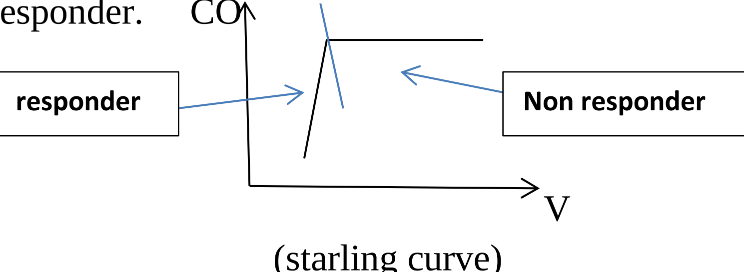
A) Cardiometry →→fluid challenge: 500 ml (mini fluid challenge 4 ml/kg =200-250ml if there is any limitation as mentioned above)

by isotonic crystalloid(500 /200)→ over10 mins gray cannulaتديه بسرعه بالسرنجة وانت جنبه أو

or passive leg raising صعب او عايز خبره (most accurate)

- If > 10% increase in stroke volume → fluid responder
- If < 10% → fluid non-responder.

Reaching plateau =increasing volume
Won't increase CO



(starling curve)

*put the leads : الألوان مرسومة على الجهاز

1- Lt mastoid process 2- Lower part of the neck 3-Mid Axillary at the level of apex
4-Mid axillary at the level of lower costal margin

Aortic diameter الطول و الوزن و الجنس علشان بيحسب الـ* full signal لازم يبقي فيه*

B) Echo → 1) Kissing sign in short parasternal indicates hypovolemia. P268
2)IVC: P271

a)In aspontaneously breathing patient :

the IVC collapses with inspiration (due to negative thoracic pressure)

→ IVC in spontaneous, not in vigorous inspiration , non relaxed patient (collapsibility) cut off value 50% :

-IVC > 1.5 cm + collapse <50% = non responder
-IVC < 1.5 cm + collapse >50% = responder
-IVC >1.5 cm + collapse >50% = further assessment→ grey zone

(look furthers:dynamic&clianical لو مش متاحة ومفيش مانع للمحاليل إدي)

b)mechanically ventilated patients :

the IVC distends with inspiration(due to the positive thoracic pressure)

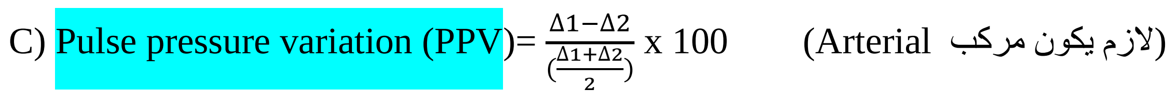
→ in ventilated patient:IVC distensibilty =max-min/mean > 13% → indicates hypovolemia

.

the patient should be:

1-ventilated with TV ≥ 8 ml/kg, 2-relaxed 3-not in ↑IAP.

Not accurate with : a) high intraabdominal pressure b) low tidal volume<8ml/kg



C) Pulse pressure variation (PPV)= $\frac{\Delta 1-\Delta 2}{(\frac{\Delta 1+\Delta 2}{2})}$ x 100 (Arterial لازم يكون مركب)

Δ1 = max. systolic BP - max. diastolic BP
Δ2 = min. systolic BP - min. diastolic BP

- PPV > 13 responder
- PPV 10-13 gray zone
  (look for other dynamic and clinical)

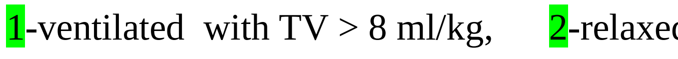


- PPV <10 not responder شفها مره مع مدرس مساعد



1) Arterial 2) افتحها 3) speed ↓ 6.25
4) arrow → خط متقطع

To perform PPV: the patient should be:



1-ventilated with TV > 8 ml/kg, 2-relaxed 3-no arrhythmias 4-not in ↑IAP.

NB:

- Sensitivity : good negative test
- Specifity : good positive test

NB: ⁎Target in CVP واحدة من التلاتة

⁎Target in cardiometery convert from responder to non-responder by fluid resuscitation .

قولي في الـ sheet هو اتحول من responder لـ non responder بعد ما اديته أد أية .

فى خلال ساعه بالكتير ندى لحد ما يبطل يزيد بس برضه اخرك 30ml/kg او يبقى non responder

ماعدا لو عيان hypoxic or anuric or cardiac (200 x 200 .)

Ventilation challenge Test : increase TV from 6 ml/kg to 8 ml/kg for 1 min احسب مرة على8 و 6 مرة على if the change in PPV (ΔPPV_{6-8})>3.5% →Fluid responder (sensitivity of this test 94% and specifity 100%)

لو عيان مش هعرف احطه على 8 ml/kg علشان ال poor compliance

☞ In case of hypoxia(P/F ratio<150) or cardiac patients(severe stenotc valve or poor contractility< 40) or anuric ,CRF/ AKI → cautious fluid supplementation

اديله 200 سم فى 200 سم (4ml/kg)وتابعه 1-لو لقيت خطوط بيضا بتزيد وبقت significant LU/S او

2- pf ratio بقت وحشه 3- لو فيه basal creps. ←وقف المحاليل

☞ In case of wet lung (pulmonary congestion → B-lines in lung ultrasound) with poor PF ratio (< 150) → use vasopressors instead of fluids to maintain BP even in fluid responder patients.

d)Pulse pressure : (S-D) (good +ve test) (فى حوادث الجراحه والرعايات المعزوله)

Give 4ml/kg fluids over 10 mins ,If PP :

- >15% → fluid Responder (up to 30ml/kg except in cardiac,Hypoxic& anuric).
- <15%→assess CVP if :

زادت أقل <2 give another bolus 4ml/kg then reassess (Up to 30ml/kg).

زادت >5 donot give any fluid and reassess pulse pressure.

e)LIDCO Arterial جهاز بيتوصل بالـ

Most accurate dynamic methods:fluid challenge(500ml),passive leg raising one unit trend هام Cadiometry or LIDCO

c) **Clinical manifestations of dehydration or overload: صدّق العليل**

♦ Dehydration → thirst, dry tongue & skin turger.

♦ Overload → pulmonary congestion, puffiness & lower limbs edema.

Nb: **In non-hypoxic or not cardiac patient :**

لو في حاجات بتقول انه responder وحاجات بتقول non responder اديله محاليل بالعقل (هام جدا)

e.g, responder by PPV & non-responder by IVC collapsibility.

ازاي تلقطه: لو العيان ال HR, BP, Conscious level بيتحسن مع الfluids و يرجع تاني يقع ← suspect hemorrhage وابعت Hbو ابحث عن مكان بينزف منه

Bleeding

Both simultaneously in major bleeding FAST

A) Medical (ABC) — B) Surgical — C) Compression

4 ABC +Trauma survey:

AB: 1- Ensure adequate oxygenation & ventilation, Intubate if necessary.

C: 2- wide-bore cannulae + IV fluids ± vasopressors + perfusion (UOP,CRT,lactate,co2 gap).

3- Target a) mean Bp: 50 mmHg except TBI & b) if Bp ↑ try to normalize it provided the patient is perfused to minimize bleeding

3 3 blood samples for (1) Hb & INR, (2) بنك الدم, ±(3) الاهل:

تنزل1) **بنفسك** تحجز دم وبلازما و2) تقف على راس فني المعمل يطلعلك المعامل وقتي ، و3) انت راجع تستلم الدم والبلازما أو لأ حسب نتيجة المعامل ولو بنك الدم مفيهوش 4) ابعت عينة مع أهله و5) تسأل علي الفصيلة في حوادث النسا و العظام و الجراحة و اعرف في كام كيس لو مفيش في بنك الدم او **limited no** او مفيش تاني و متوقع انه هينزف جامد و اللى معاك مش هيكفي ابعت مع الاهل كمان.

3 Give:

1- Drugs: dicynone, kapron & konakion

2-Activated factor seven (Novoseven): considered only if major bleeding & coagulopathy persist despite use of all other measures.موجود فى النسا

3- Hold anti-coagulation & give antidote (protamine sulphate for LMWH (من قلب و صدر) ± pneumatic cuff

2 Repeat:

1- Hb after initial resuscitation → As Hb will drop esp. in a child with scalp hematoma.

2-HB, INR, platelets **2-3 times/ day** & with every new blood transfusion علشان اعرف محتاج تاني ولا لأ

1 Optimize coagulation state in case of coagulopathy: INR(خليهnormal INR) & platelets >100000 و تعيده في نفس اليوم **بعد ساعتين على الأكثر** و ماتتخنقش مع الجراحة و انت مش مظبط نفسك (بص في المراية)

- **Kapron (tranexamic acid):** 1 gm IV shot then 1 gm infusion over 8 hours (10-15 mg/kg).

Any TBI give 1 gm kapron instantly. (عمليات المخ و الاعصاب و الرعاية)

Renal adjustment:

- 1.4 – 2.8 mg/dl: 10 mg/kg twice
- 2.8-5.7 mg/dl: 10 mg/kg once
- >5.7 mg/dl: 5 mg/kg once

- **Novoseven dose:** 90 mic/ kg IV bolus/ 2 hours till achieving hemostasis.
- **Target platelet count:**

> 50, 000

< 100, 000 in case of:

1) ongoing bleeding or 2) TBI

If less: consider platelet transfusion

Give platelets even with normal count in patients on Antiplatelets drugs (Plavix) with massive bleeding.

Incase of DIC: Cryo, Novoseven, Fibrinogen

NB: In case of massive blood transfusion p.236:

1. Take care of complications p. 115
2. Keep the ratio 1:1:1

Bleeding

ازاي تلقطه: لو العيان ال HR, BP, Conscious level بيتحسن مع الfluids و يرجع تاني يقع ← suspect hemorrhage وابعت Hbو ابحث عن مكان بينزف منه

Both simultaneously in major bleeding **FAST**

A) Medical (ABC)

B) Surgical

C) Compression

Stop bleeding if possible till surgical intervention: مفيش عيان بيموت من نزيف رجل او ايد

Abdominal collection (3)

Management:
Medical +
1. Hb / 4 hrs. (as CL, UOP, Peak)
2. FAST + IAP every 24 hrs. or more frequent in case of unexplained instability.
3. Erect abdominal x-ray to exclude perforated viscus (air under diaphragm).

NB: retroperitoneal hematoma p. 115: conservative management unless: a) severe Hb drop, b) increase free fluid FU with US c) CT e contrast, d) severe instability

Visual bleeding (6)

Management:
Medical + Surgical intervention
1. Bleeding stump
2. Bleeding colostomy
3. Bleeding wound

(1–3: Surgical + Compression)

4. Hematemesis → 1-cold saline wash, 2- مناظير, 3-controloc infusion,
4- esophageal varices: sandostatin, Ab
5. Hemoptysis → CT e contrast ± surgery/ bronchoscope
6. Intracerebral hemorrhage → surgery/ conservative

Liver tear closed with packs (3)

Management: Medical +
1. Close follow up of:
   - Hb.
   - Coagulation profile.
   - Lact.
   - UOP
2. Intra-abdominal pressure: if 1-tense abdomen حط إيدك حسه or2- acidotic or 3- oliguric و لو علي ازاي تقلله؟
3. After:
   a) Two days: the packs should be removed.
   b) Two weeks: Do ERCP: in case of biliary leakage (either 1-major duct leak or 2-cut surface leak).

NB: retroperitoneal hematoma conservative لو اتفتحت غالبا هيموت (see next page)

Pelvic fracture (3)

1. Pelvic binder. ملاية مبرومة
2. Fixation in case of persistent bleeding
3. FU e pelvic Us/ Hb in case of fluid collection

Brain injury (3)

- Intracerebral hge
- Brain contusion

1. Give Cyclokapron on admission
2. FU (CL/ 4hrs., CT after 24 hrs., Repeat with deterioration
3. Follow TBI algorithm)

Complications of blood transfusion (3)

While receiving or 1) Immediately after

Early → fever, dark urine, shortness of breathing, itching, skin flashing, fainting or dizziness, back pain , DIC, ↑K

2) Late → AKI, Anemia, pulmonary edema, anaphylactic shock (life threatening condition)

3) Massive → alkalosis, late acidosis, ↑K, ↓ca, hypothermia

Management: if while transfusion
1) stop immediately,
2) 2 blood samples من العيان و من كيس الدم or rematching,
3) Drugs: Dexa, Solu, Avil & antipyretics,
4) IV Fluids و عينك على كيس جمع البول ± diuretics
5) K, CBC, INR

In case of AKI: Goal is to maintain adequate BP & renal blood flow with IV saline & frusemide 40-80 mg initially → to maintain UOP 100 ml/hr. for 24 hrs. If no diuretic response after 2-3 hrs. → ATN , restrict fluids, consult nephron for dialysis

In case of shock or hypotension: use vasopressors use vasopressin cautiously ↓↓ RBF

Pulmonary edema, Anaphylactic shock + ttt

Retro peritoneal hematoma : تتفتح لو

1- لو فرقعت Hepato Lienorenal free fluid in FAST :

2- الـ Hb بيسقط سقوط حر غير مستجيب للدم

3- لو العيان بقى hemodynamically un stable

4- لو persistant increase in IAP و أدى الي compartmental syndrome (acidosis or oliguria)

⁎ **Follow up with :**

-Repeated Hb - Follow up US frequently - CT with IV contrast (best option)لو الكلي تسمح

- interventional radiology : embolization of feeding vessele.

Chest wall hematoma :1- Medical (Elastic stocking or Elastoplast **)** Or 2- Surgical

Intra-abdominal pressure تحس بطنه لو مريحه ماتقشش

☞ حط ايدك علي بطن العيان لو lax خلاص لكن لو tense نقيسه (ازاي؟) والعيان supine ... احقن 25 سم ملح في قسطرة البول ووصلها ب جهاز وريد ومسطرة cvp.

☞ Intra-abdominal pressure is important because renal perfusion pressure = MAP – (2 X IAP).

☞ Suspect high IAP in the following conditions:

1- Major trauma/ burn
2- Abdominal collection
3- Tense ascites
4- Massive transfusion
5- Abdominal surgery with tight closure
6 - Liver tear closed with packs >>edema+نز

☞ In case of a) in adult high IAP > 20 cmH_2O, a higher MAP is desirable (80-85 mmHg)
b)in pediatrice high IAP >15cmH_2O
فى الاطفال احقن volume 1ml/kg (max 25 cm ,min 3 cm.)

How to reduce. لو عالي عملت ايه

Consider intervention to reduce IAP especially if causing AKI (oliguria or acidosis):

1-NPO 2- Tapping in case of ascites 3- Ryle (open) 4- Rectal tube

5- Surgery (pogota, fasciotomy (in burn **H** shape) or skin closure only يشبط جلد بس)

➢ Causes of coagulopathy associated with massive bleeding:

1)10 units in 24hr 2) >50% of TBV in 3 hrs 3) 4 units in 1 hr

a) Acidosis.
b) Coagulation factors loss.
c) Coagulation factors consumption(large hematoma) .Consumption co agulopathy هام جدا
d) Coagulation factors dilution with resuscitation.
e) Hypothermia associated with resuscitation..

➢ In case of **spleenectomy** →1- Give vaccination for hemophilus influenza, pneumococci & meningococci either before surgery or on day 14 after surgery.

من الاحسان اديله كارت يجيبه من المصل و اللقاح نفس فكرة fistula in dialysis or artificial limb

2- If platelet count > 1 million → give anti-platelet. 3-bleedingصفحة ال

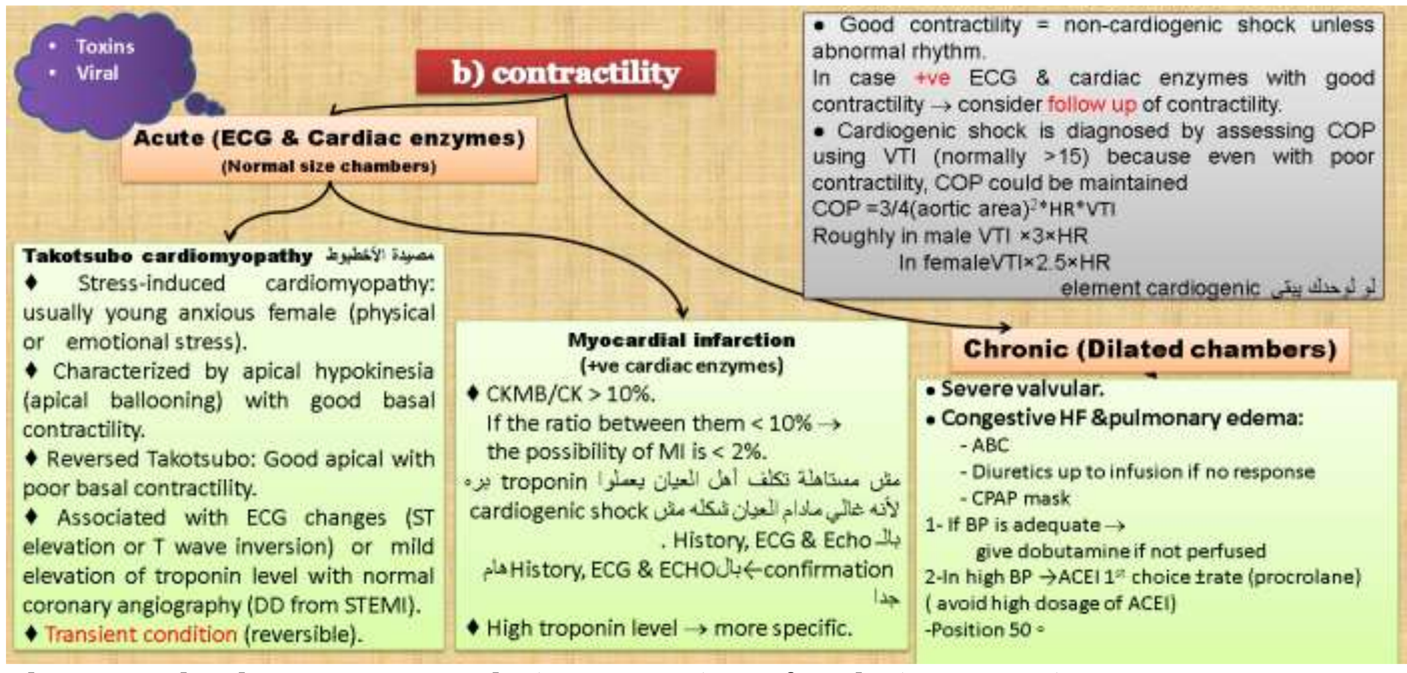
2. Cardiogenic shock : ***=(hypotension <90 , hypoperfusion, Cardiac index <2.1)this could be due to impaired cordiac output due to a) rhythm ,and/or b) contractility***

a)☞ Rhythm (life threatening) *brady → Mobitz II type 2or 3rd degree HB

*tachy-arrhythmias →rapid AF ,SVT هام جدا جدا

Management: ABC + treatment of the cause + specific (atropine ,adrenaline ± isoprenaline, pacing→complete HB , DC → V. tach. & ablation→very frequent SVT not responding to ttt).

NB: if the chambers size is large →mostly not acute condition , its old pathology.



-lt ventricular dimensions in male (3.9-5.3cm) , in female (4.2-5.9cm)

Obstructive shock: مش بحكم على حاجة من view واحد

→all can be diagnosed by ECHO (بره وجوه) esp in chest trauma

A) Pulmonary embolism→ right side diltation in 1) parasternal long(>1.1) or short 2) apical four (septum must be perpendicular) >0.6 3)sub-costal >1.1

b) Pneumothorax → right side dilatation & absent sliding in lung ultrasound or by xray.

c) Cardiac tamponade (in apical 5 freeze and roll +long parasternal)

→ collapsed rt ventricle in diastole.esp in chest trauma , renal ,severe congesion

- **Peck's triad** in cardiac tamponade → Suspected in any patient chest trauma(blunt) + shock. a- Distended neck veins, b)Decrease Bp & c- Distant heart sounds.

NB: DD of hypoxia →obstructive shock(kissing sign) &contractility هتخلص (مهم جدا جدا)

4. Distributive shock (responder or non responder)

a) **Septic shock**: **very very common** هام جدا

diagnosed by presence of septic focus +

1- Hypotenion 2- not responding to fluids +3- inotropes + 4-lactate >2.

b) **Anaphylactic shock**: ephedrineتذكر عيان عمليات بعد المضاد على المحلول بيقع و مش بيمسك نفسه

History of drug intake + skin rash + edema

Management: ABC + Avil + Solucortef (used in TPA and IVIG) + Adrenaline (1) 0.5 mg IM or (2) 100-150mcg IV if you have line (faster than IM due to ↓perfusion)up to (3) IVinfusion.

c) **Neurogenic shock**: brain or spine

Brain → Central (DCL) → Hemorrhage, trauma, tumor.

Spine → Peripheral (spinal cord transection) → Trauma T6 (cardiac plexus).

d) **End organ failure eg** :**Portal vein thrombosis** :

Consider in suddenly collapsing patients with hepatobiliary surgery.

Diagnosis: 1-Shooting liver enzymes الألاف 2- **Doppler** ±Autoimmune

If occurring in transplanted patient → Urgent surgical revascularization (open or interventional radiology).

If not → Liver transplantation + liver support → very poor prognosis(liver cirrhosis).

NB:Endocrinal causes of shock

- ♦ Diagnosis depends on history & hormonal profile → Myxedema & Addisonian crisis.
- ♦ Myxedema(cardiogenic): suspected in case of1- obese patient 2-or bradycardia.

Treatment: 1. ABC + 2. 300-500 μg of Eltroxin orally 3-5 days , If ryle → ↑dose by 25 μg لو مش موجود باخد 50 في يوم و 100 في اليوم اللي بعده. أمريكا فقط Optimum IV but not available + 3. Solucortif + 4. Symptomatic

* يتاخد 6 صباحا وصيام ساعه قبل وبعد

♦ Addisonian crisis(distributive): e.g

- 1- Hepato-adrenal syndrome,
- 2-pituitary lesion or
- 3-pituitary surgery
- 4-adrenal lesion
- 5-adrenalectomy
- 6- patient on steroid therapy + stress

} infection , trauma surgery , pregnancy

Cortisone cause 1-salt &water retention. 2-k, H excretion. 3- hyperglycemia

Clinical picture:

Metabolic acidosis, hypovolemia, hypoglycemia, hyperkalemia , DCL & shock .

Treatment: 1- ABC + 2- IV hydrocortisone 200mg +100 mg /6 hr…until taking oral 20mg in am &10mg in pm +fludrocortisone 50-100 mcg/day
3- saline & 4- glucose infusion + 5- symptomatic.

☞ Any hepatic patient on levophed (hepatoadrenal syndrome) → add solucortef even if on minimal support.

☞ Sick euthyroid syndrome:

T3:Slightly Low   T4: low or normal   TSH: normal, slightly high or low.
but not depleted

A compensatory mechanism for tissue metabolism(.↓metabolism)

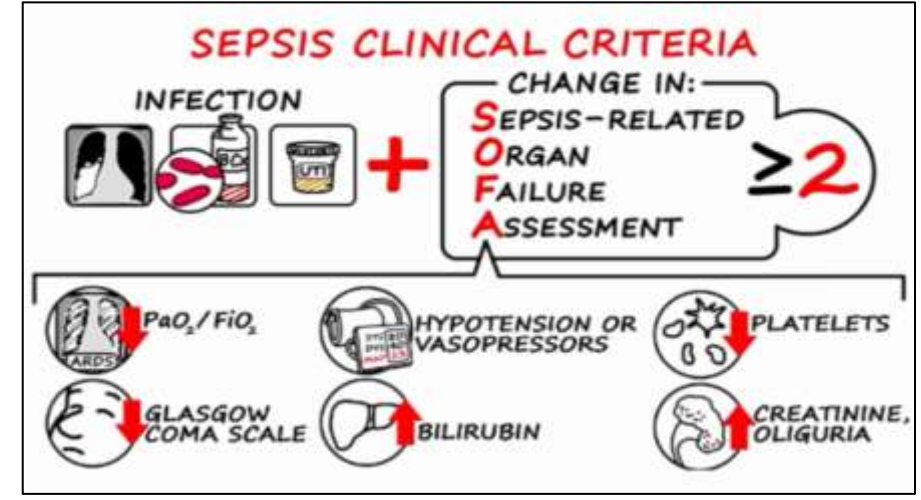
Considered as a normal variant with shock requiring no treatment.

SEPSIS & SEPTIC SHOCK

Sepsis: *A life-threatening organ dysfunction caused by a dysregulated host response to infection.*
Organ dysfunction: *Acute change in total SOFA score ≥ 2 points consequent to the infection.* الرسمه

Defenition of Septic shock:

1- Sepsis
2-persisting hypotension requiring vasopressors to maintain MAP ≥ 65 mmHg & having a serum
3- lactate level > 2 mmol/L (18 mg/dL)
4- despite adequate volume resuscitation.



Screening tests : الطب احساس

A)Quick SOFA:

CNS: drowsy
Respiratory: tachypnic (RR > 22)
CVS: borderline BP (SBP < 100)
☞ If 2 +ve → ICU admission & search for source of sepsis.

NB: INR should be checked dialy .

B)National early warning score (NEWS):

Quick SOFA + SO_2 + temperature.جداول
More accurate than SOFA in detection of sepsis patients.

C)Modified Early Warning Score (MEWS) 1-sys.BP 2- Heart rate 3-Resp. rate 4-temp. 5-alert

Management of sepsis & septic shock → within 1-2 hours ***(6 items :3+3)***

ABC + infection :

❶ **ABC** ❷ **Pan-cultures: + antibiotic**
❸ **Elimination of septic focus (medical,surgical & chronic devices)**

Resuscitation :(volume-pressureperfusion)

❹ **Fluid resuscitation (volume)** ❺ **Mean ABP: (±Solucortif 0.2mic=5ml)**
❻ **perfusion (monitored by UOP , Systems , CRT ,lactate,Scvo2,CRT)**

→Systems → Peripheral →Labs (a+b)

a)**Central venous saturation ($ScvO_2$** b)**Follow up a)lactate level c)CRT d)UOP**

1- **ABC : + antibiotic ترابيزة+ ترولى**

يعني العيان يكون ماسك ضغط و saturation و satisfactory blood gases خلال نص ساعة ... يا يكون وصل

maximum maximum ±glypressin و المضاد الحيوى يتاخد وانت واقف اول ما العيان يدخل مع ال **inotropes**

♦ **In non-ventilated patients**:

ensure proper oxygenation & ventilation with adequate BP &accepted blood gases.

♦ **If indicated for ventilation with sufficient time** (not pre-arrest),

e.g; severe metabolic acidosis causing marked tachypnea:

- Obtain adequate IV access & ensure adequate BP before intubation

by vasopressors, fluid resuscitation or both(حسب العيان).

لو ضغطه واقع المحاليل وال inotropes يتحطوا فى نفس الوقت لو border line ممكن نصبر على ال inotropes

- Increase levophed dose rapidly (not gradually) till adequate BP is obtained.
- If no CVL inserted yet, don't waste time in inserting one. Instead, levophed can be infused peripherally up to 2 hours → بس حط عليه ستوب كوك ومحلول عشان يمشيه
- before intubation (see tube insertion p.72).

♦ **If already ventilated** (or after intubation): p.67

2- **Pan-cultures . (ideal before antibiotics if any delay ignore till next morning)**

☞ **MALDI TOF:** مزرعة بتطلع نتيجتها خلال 24 ساعة ... موجودة في مستشفى 57357

☞ ***Biofire*** :A) respiratory panel (viral only)

B)pneumonia panel (viral or bacterial or fungal)

موجودين فى 57357 والسعودى الالمانى ووادى النيل و في خلال ساعة بـ 3000جنية.+200جنيه تطلع senstivity

Minimal inhibitory concenteration (MIC):if

>16→resistance even if on high dose of antibiotics

<2→sensitive

2-16 →need high dose and continuous infusion to achieve plasma level

3- **Elimination of septic focus:**

- **Medical:**

Broad spectrum antibiotics according to infection site&severity p.178 →

ABC & INOTROPES تتاخد بنفسك وانت واقف بتستلم العيان وهو علي الترولي مع الـ

In cases with very low TLC count → consider IVIg(قرار استاذ.)

1) Bridging in immunocompromised patients لحد المضاد الحيوي ما يشتغل 2) Toxic shock syndrome

If neutrophils < 500 → Neupogen.(bone marrow stimulant increases TLC)

- **Surgical 19 نقطة P(33) تحضيره قبل ما ينزل عمليات**
- **Chronic devices:** e.g, CVL, urinary catheter, drain , tracheostomy& chest tube.

4- **Fluid resuscitation:**

- According to fluid responsiveness:
  - a) Dynamic: IVC collapsibility, cardiometry & PPV.
  - b) Static (CVP): targeting 12 cmH_2O in spontaneously breathing patient or 15 cmH_2O in ventilated ones

  (maximum: **30 ml/kg** except in hypoxic, cardiac & anuric patients).

  لو في تضارب بين الـ dynamic measures والعيان مفيهوش مشكلة مع المحاليل ← ياخد محاليل لحد ما التضارب ينتهي أو العيان حالته تسوء(lung congestion or hypoxia) .

  - c)clinical
- **Crystalloids are preferred**.
- Avoid colloids as it may worsen the prognosis.
- Albumin 5% can be used: بشرطين → Responder & Oliguric . هام
  - a) After 30 ml/kg crystalloids & the patient is still responder.
  - b) From the start in oliguric patients with hypoalbuminemia.

  حط 2 فيال ألبيومين 20% (كل فيال 50 سم) على 300 سم رينجر .

- Stop fluid resuscitation if the patient become stable, non-responder or congested clinically (crepitations) or radiologically→ (B-lines in lung ultrasound → **earliest sign**) or frankly hypoxic …

  If so & still fluid responder → consider inotropic support.

5- **Mean ABP: (±Solucortif**) 6ml levo unless hepatic or hepatoadrenal.

- **Keep MAP > 65 mmHg (> 85 if hypertensive side effects hge & arrhythmia if not perfused→65mmhg)** → start with levophed or vasopressor then adrenaline±glyopressin if hopeful. increasing the MAP by adding vasopressor in chronically hypertensive patients to 80 for 2 hrs, if negative(no Improvement of CRT & lactate) they reduce MAP to 65 even in hypertensive patient , if the test is positive(improving of CRT & lactate) continue high dose.

  - **If the rate of nor-adrenaline infusion > 6 ml/hr** →

    add solucortef 50 mg/6 hrs IV plus Astonine-H (fludrocortisone) 0.1-0.2mg oral tablet/24 hrs.

  - **In patients with difficult weaning from levophed**

    (on minimal dose levophed for long duration):

    add solucortef + midodrine or corasore or glypressin

    Midodrine (1 - 7 tab /8hrs).tab:2.5 mg →splencnic VC ,

    contraindicated in active cardic condition & ischemic bowel(absolute contraindication) in Chronic IHD(relative CI) .

    Or corasore 2 tab /8hrs or oral drops 25 drops /8hrs.

    Or add glypressin 4-8 ml, wean levo 1st then withdraw glypressin.

NB:make sure that the cuff size is adequate of the patient ,if large or on LL may be false low

حط ايدك على ال pulseمهم جدا.

هام جدا ● **In bed-ridden patients:** (especially geriatrics or cardiac) with difficult weaning from levophed → stop levophed gradually, monitor

a) conscious level ,b) UOP c) lactate

and add solucortef + midodrine or corasore

→ low BP is accepted in such patients regarding that no deterioration develops in those items اصبر ربع لنص ساعة لو الضغط وطى وادیله شویة محالیل صغیرین

هام: العیان ال cardiacمایخرجش غیر لما یبقى معتمد على نفسه تماما فى الحركه وننبه على الجراحین مایاخدش محالیل كتیر

NB Don't give Iron in septic shock

- **In pediatrics:** according to temperature of extremities:

a) Warm septic shock: start with dopamine or levophed → then adrenalin.

لو طفل في الرعاية علي levo و اطرافه لسه ساقعه او capillary refill وحش ممكن أسنده بسنة adrenaline

NB: If low mixed venous start adrenaline before reaching maximum levo.

b) Cold septic shock: start with dopamine or adrenaline(↑CO) → then levophed.

6-perfusion (UOP, Systems , CRT) : Keep UOP > 0.5 ml/kg/hr **یجیب اد مایاخد تقریبا** **& confirm adequate peripheral perfusion and check CO2 gap.**

Systems : Signs of hypoperfusion include:

CNS: DCL.

CVS: tachycardia, hypotension, weak thready pulse & delayed capillary refill > 2 seconds.

Respiratory: tachypnea.

Renal: oliguria. Others: ↑lactate , cold clammy skin, CRT.

* Capillary refill time is more superior than UOP but not practical .

a)Capillary refill time :is defined as the time taken for color to return to an external capillary bed after pressure is applied to cause blanching 3sec. in fingers 5sec. in knee .it can be measured by holding a hand higher than heart level and pressing the soft pad of fingernail until it turns white, then taking note of the time needed for the color to return once pressure is released.

b)**Central venous saturation ($ScvO_2$):**

اتشالت من ال SSC guidlines لكن ناس كتير مقتنعة إنها مهمة

- If SO_2 < 92 % (hypoxic patients) → $ScvO_2$ has no value(mixed venous متبصش لل)
- Keep it > 65 %.
- If < 65% → ↑↑ Hb > 9 → ↑ delivery of O2 to tissues→ ↑O2 content
- If still < 65% → start dobutamine infusion in adults 3-5mcg/kg/min If impaired contractility →↑ COP

(لو ضغطه موطیش جامد بعدیه) or adrenaline in pediatrics.

c)**Follow up lactate level (lactate clearance) or CO_2 gap :**

After 2 hours → lactate should ↓↓ > 20% …(good prognosis) Target: < 2 mmol/L.

d)UOP

☞ **Mixed venous saturation (SvO_2):** SVC +IVC
obtained from pulmonary artery catheter & represents the
function of oxygen delivery & extraction in the entire body. Normal value 70-75%.

☞ **Central venous saturation ($ScvO_2$):** obtained from CVL (superior vena cava) & indicates oxygen consumption from the upper half of the body including the brain → So, it is slightly less than SvO_2 (65-70%). However, in anesthesized patient it increases due to decreased cerebral metabolic rate.

NB Neutrophil :lymphocytic ratio : normally from 1-3 لما نتقابل في الرعاية نقولها

If ratio **above 9 in patient with pulmonary embolism** the mortality is high. قراءة رشيدة

in septic patients if ratio is

- **low (below 2) and pt is unstable** →need exogenous steroid or catecholamine
- **If high(above 9) and unstable** →poor prognosis
- **If high(above 23) and stable** →patient is still in danger
- **In acute pancreatitis** and ratio above 15 →14% mortality

Peripheral : Individualization of Cardiac output and perfusion:

To say whether Cardiac output adequate or not depend on :

-a) capillary refill time

- Above 3 seconds in the finger and above 5 seconds in the knee(in pediatrics) is considerd abnormal

  Target: Improve CRT within 30 mins , Lactate :↓ 20% in one hour

  Inodulator test (individualization test)

After fluid responsiveness check the perfusion if the patient is not responder and still hypoperfused , give dobutamine infusion for 2 hrs,if CRT is improved continue the infusion If there is no improvement discontinue the doputamine.

-b) incease the MAP by adding vasopressor in chronically hypertensive patients to 80 for 2 hrs , if negative(no Improvement of CRT & lactate) they reduce MAP to 65 even in hypertensive patient , if the test is positive(improving of CRT & lactate) continue high dose.

NB: Ammonia may be high in septic patient with DCL

Pancreatitis as DD of chest pain &acute abdomen

Sepsis عيان → for follow up

Presented with acute abdomen or chest pain

Diagnosis :

- Abdominal pain.
- Serum amylase and/ or **lipase** (diagnostic أهم) > 3 times upper limit of normal.
- In patients who fail to improve clinically within 48-72 hours → consider CT with contrast oral & IV, MRI or abdominal ultrasound (دكتورة مها).

Management : ABC +

1. **Aggressive hydration** with ringer lactate according to fluid status (static, dynamic & clinical).
2. **ERCP**: patients with acute pancreatitis and concurrent acute cholangitis (if there is stone)should undergo ERCP within 24 hours of admission (liver enzymes هينام حتي لو عالية الـ) EMERGENCY:

Acc to : fever , CRP , TLC, Dose of inotropees , procalcitonin , culture .

3.Antibiotics: no role for prophylactic antibiotics

(choise of antibiotic acc to start P(185) &modulate p(188)

- Infected necrosis or extra pancreatic necrosis should be considered in patients who deteriorate or fail to improve within 7 – 10 days of hospitalization.

Infection غالبا فى ◆ Empirically use carbapenems alone or (quinolones / cefepime / ceftazidime) plus metronidazole in case of presence of clinical signs of infection & abdominal imaging demonstrating the presence of gas within the necrosis without aspiration & culture.

- In patients who fail to improve يسقط سقوط حر: consider surgical debridement of pancreatic necrosis (necrosectomy**).**

Pig-line ب وماتتحلش(unstable) عيان الـ pancreatitis ميتفتحش غير للشديد القوي

- In stable patients with infected necrosis: we attempt to delay necrosectomy by continuing antibiotics for at least 4 weeks till wellformed cyst ± pigtail د.مها.

4. **Nutrition**:
   - Mild cases: in absence of nausea, vomiting & abdominal pain, start oral feeding with a low fat solid diet (immediate).
   - Severe cases: start enteral nutrition(oral or ryle)

(parenteral nutrition is reserved if enteral is 1) not tolerated or 2) not meeting caloric requirements.

➢ If IAP >20 insert ryle for drainage even if tolerating انزله ازاي ؟ page(115) :

5. **Correct hypocalcemia if present**:

Not routine → to correct, check serum ca

Recommendations for sepsis & septic shock

Summary of SCC 2016 recommendations

Stage	SCC recommends	SCC recommends against
Initial resuscitation	30 mL/Kg crystalloids in 1st 3 hours – target MAP >65 mmHg Assessment of cardiac function if shock cause in unclear Dynamic methods for fluid responsiveness - Normalizing lactate	
Diagnosis	Appropriate cultures BEFORE and WTHOUT delaying Antimicrobials	
Antimicrobials	Empirical - Broad spectrum - As soon as possible - Narrowing the spectrum once pathogen is identified Daily assessment for de-escalation Empiric combination therapy - Duration 7-10 days (usual) Shorter duration sometimes (if the source was effectively controlled) Longer duration if there is slow response Procalcitonin measurement - Using procalcitonin to support discontinuation	Sustained antimicrobials in severe inflammatory states of non-infectious origin (Pancreatitis, Burns) Combination therapy in neutropenic sepsis
Source control	Early source control – Removal of suspicious IV access	
Fluid therapy	Fluid challenge techniques - Crystalloids are the fluid of choice Balanced crystalloids or saline. Albumin in addition to crystalloids in initial resuscitation and subsequent volume replacement if large crystalloid volumes are needed	HES
Vasoactive drugs	Norepinephrine is the 1st line vasopressor Adding epinephrine or vasopressin to decrease norepinephrine dose Dopamine (instead of norepinephrine) in selected cases (relative bradycardia with low risk of arrhythmias) Dobutamine in cases of persistent hypoperfusion Arterial catheter in all patients requiring vasopressors of resources are available	Low dose dopamine for renal protection
Steroids	Hydrocortisone 200mg/day if shock not responsive to fluids and vasopressors	Steroids if responsive to vasopressors

SCC 2021 recommendations

Fluid	Balanced crystalloid eg ringer acetate recommended, NS & gelatin avoided Crystalloid is 1st choice for resuscitation
Antibiotics	Prolonged infusion of B-lactam in maintanence over conventional infusion
vaoactive	In case of inadequate BP add vasopressin or adrenaline against terlipressin (glyapressin)

Blood products	RBC transfusion if Hb<7g/dL (in absence of myocardial ischemia, severe hypoxemia, and acute hge) Platelet transfusion if count is less than: • 10,000 with no bleeding • 20,000 with risk of bleeding. • 50,000 with active bleeding or invasive procedure.	Erythropoietin for management of anemia FFP for correction of coagulation in absence of bleeding or planned intervention
Ventilation	TV 6mL/Kg – plateau < 30cmH₂O – Higher PEEP – Prone in severe ARDS – conservative fluid strategy – head elevation 30-45 degrees – daily SBT) Recruitment in severe ARDS – neuromuscular blockers for <48 hours in severe ARDS	HFOV – PA catheter B2 agonists in sepsis-induced ARDS without bronchospasm
Sedation	Minimize sedation	
Glucose control	Target < 180 mg/dL - Caution with capillary blood Measure every 1-2h till stable then every 4h - Use arterial blood if the patient has an arterial catheter	
RRT	Use RRT (intermittent or CRRT) in sepsis induced AKI – CRRT if unstable	RRT for oliguria or ++ creatinine without definitive indication
Bicarbonate		Bicarbonate therapy if PH > 7.15
VTE prophylaxis	Pharmacologic prophylaxis with LMWH rather than UFH Combination pharmacologic + mechanical whenever possible Mechanical prophylaxis alone if pharmacologic is contraindicated	
Stress ulcer prophylaxis	Prophylaxis in patients with risk of GI bleeding (MV>48h – RRT – liver disease – coagulopathy – high organ failure scores)	Prophylaxis in patients without risk of GI bleeding
Nutrition	Early initiation of enteral nutrition rather than complete fasting or IV glucose Hypocaloric or early full enteral feeding (no difference) In patients with feeding intolerance or risk of aspiration: (Monitoring of residual gastric volume - Prokinetic drugs - Post-pyloric feeding tubes)	Early PN (alone or in combination with enteral) if enteral is feasible Early PN (alone or in combination with enteral) if enteral not feasible for 7 days Routine monitoring of residual gastric volume - Omega 3 fatty acids – IV selenium – Glutamine

Red colour: Strong recommendation or best practice statement **Blue colour: Weak recommendation**

SCC recommendations 2021

Nutrition	Take care of refeeding $ in case of starting Full TPN after prolonged starvation
screening	Against using qSOFA compared to SIRS , NEWS,or MEWS MEWS could be as single screening tool.

Chest pain for DD
MYOCARDIAL INFARCTION or Angina

Differential Diagnosis of Chest pain → **'Life threatening conditions'**

شكوى تحترم وميروحش إلا بعد الـ exclusion

1. **MI**
2. **Pancreatitis p 124**
3. **Dissecting aortic aneurysm:**

➤ **Diagnosis:** ▪ Unequal pulse(ايدك و الضغط) around 20% difference

a▪ CXR: wide mediastinum

b▪ Echo: shows ascending & descending aorta

c▪ Abdominal ultrasound(abdominal Aorta part of FAST بره)

d▪ CT angiography: the gold standard

➤ **Management in ICU till surgical intervention:**

▪ Close monitoring of hemodynamics + bed rest & proper sedation.

▪ Control HR & BP with beta blocker provided being a) vitally stable because ↑BP &↑HR → more dissection b) if border line BP→give procrolan.

▪ Manage as bleeding if spontaneous hemothorax →chest tube هتموته due to fistula with osephagus (see shock:medical & surgical)p(114)

➤ **Surgical intervention according to site of aneurysm:**

▪ Ascending aorta or aortic arch aneurysms → Cardiothoracic surgery. لازم يتوصل بالمكنة

▪ Descending aorta: thoraco-abdominal or abdominal (suprarenal or infrarenal) → Surgery (a) stenting in old age ,b) grafting in young) + organ preservation (kidney & spinal cord)

+blood trsfusion + reperfusion + cardic patient management .

▪Stent → ممكن تعمل dissection تاني بعد فترة علي level اعلى فيضطر يدخل يعمل واحدة تانية بـ level اعلى

4. **Gastritis and reflux& perforated viscus.**

air under diaphragm (perforated vicus) or upper GI(if persisting)

5. **pulmanary embolism**

Myocardial infarction

As one of the causes of chest pain

1) Diagnosis

1. **Angina:** -ve enzymes
2. **MI**
   a) non STEMI : ECG + enzymes
   b) STEMI: ECG mainly + enzymes

2) Management

STEMI:

3 hrs. → (PCI + TPA or Strept. + consent + cardiac consultation),

3-12 hrs. → (best PCI),

12-48 hrs. → (PCI),

>48 hrs. → (PCI if a) symptoms, b) hemodynamically unstable, c) arrhythmias)

+ Management as NSTEMI

NSTEMI:

1-ABC,

2-*MONA* → (Morphine, Oxygen, Nitrates, Antiplatelets & anticoagulants),

3-Statins: take care of liver enzymes & CK

4-Rate control: 4 + 2 NB

5-Prevention of Remodeling: (ACEI , ARBS or Aldactone).

6.± Diuretics,

7.ARNI (Enteresto)

8. Fursid

Chronic Ischemic Heart

1. Nitrates: Dinitra for angina.
2. Antiplatelet
3. Statin.
4. Rate control: 4 + 2 NB
5. Prevention of remodeling (ACEI , ARBS or Aldactone).
6. Vastaril : in chronic patient if persisting chest pain
7. Ask cardiology for elective PCI.
8. PPI → high risk of GIT bleeding (ulcer, GERD, Dyspepsia,,...)
9. ±diuretics

Myocardial infarction

Diagnosis.

Angina: Typical chest pain + ECG changes + -ve enzymes(as in stress ,toxic& septic myocarditis)

MI:ممكن يكون chest pain لازم تبقي مركز مع كل عيان يجيلك ب

- **non STEMI** : ± ثلاثة واحدة ثابتة

♦الثابت 1. ↑↑ Cardiac enzymes تطلع بعد نص ساعه فبتنزل بيها بنفسك وتطلع بيها

(follow up after 2 hrs then every 8 hrs → if not rising, could be renal or on statins).

+ 2. ECG changes topographic (ST , T dynamic changes"comparative study")

and/or 3. typical chest pain.

♦ In case of +ve ECG changes or typical chest pain with -ve cardiac enzymes → follow up cardiac enzymes after 2 hrs ,if -ve→DD of chest pain.

Cardiac Enzymes:

CK-MB onset: 2-4 hrs, peak 5-9 hrs with duration up to 30 hrs.

Troponin T or I(specific) onset: 4-6 hrs, peak 12-24 hrs with duration from 7-10 days.

☞ In renal patients, cardiac enzymes may be elevated → follow up the trend → if not rising → non-cardiac origin مهم جدا جدا.

NB:hs-cTn(high sensitivity cardiac troponin)is the best recommended due to rapid onset (1hr) (expensive)

- **STEMI : (لازم تتاكد ان avr مقلوبه)**

(very limited time factor once diagnosis immediate management)

CHEST PAIN + ECG changes ,don't wait rising of cardic enzymes .

1**All leads** →one small square enough to diagnose ST segment elevation topographic

1.5 except **V2 ,V3**→Female ≥1.5 small squares

2 →Male > 40yrs →≥2 small squares

2.5 →Male <40yrs→ ≥2.5 small suares

لازم قاعدعاًة مش بنعمله **V7,V8,V9** →≥ 0.5 Small square =STEMI (posterior axillary, mid scapular , paravertebral) 4,5,6 مراية

Once suspect ST →look immediate for reciprocal changes (reflex) هام جدا جدا.

- Inferior MI :look on:
  - a)lateral leads →ST sagging 100% MI
  - b)± arrythmais up to HB (same blood supply of inferior & SA node)
  - c) ± Rt side ECG →V3 ,V4 ST elevation
  - d) ± posterior ECG اعمله (بياكدوا التشخيص بس غيابهم لا ينفيه)

(the same blood supply) يعنى هيعمل3 مرات شمال ويمين وقاعد

IMMEDIATE strept & arrange for catheterization unless ready for PCI within 2 hrs from the onset of chest pain

- Lateral/anterior MI (STEMI or non STEMI) :
  ST depression in inferior leads → posterior ECG لازم تعمله
  يعنى هيعمل مرتين

N.B : comparative or dynamic يعني

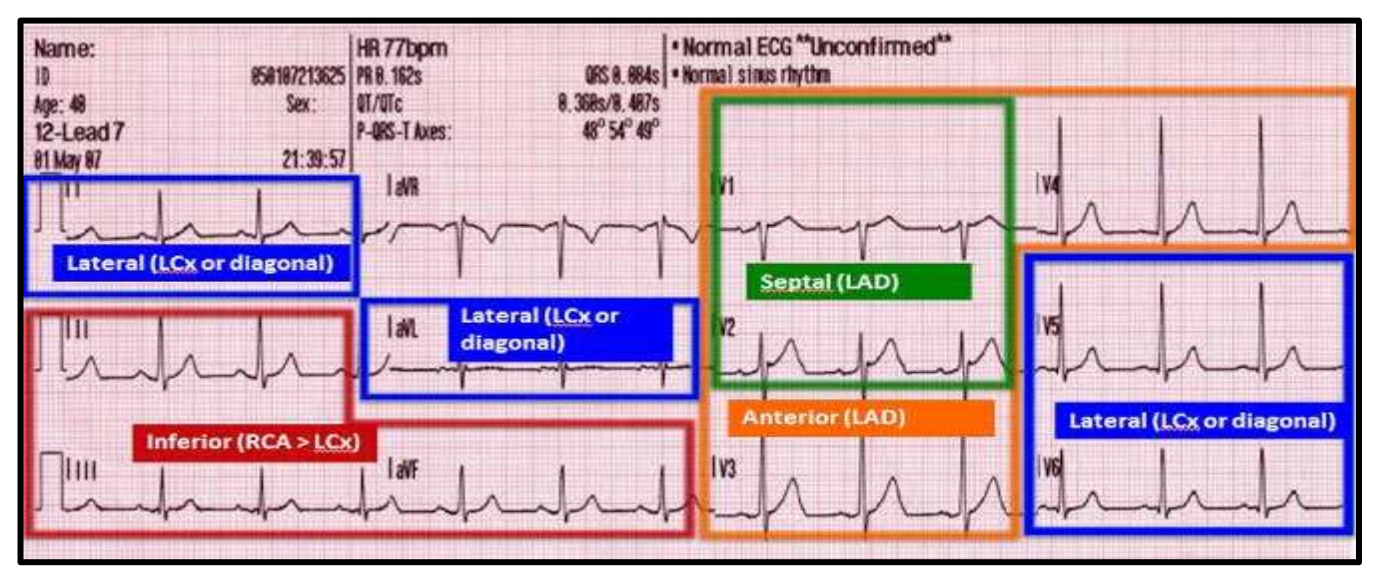
- **acute RBBB OR LBBB + Typical chest pain = STEMI→echo +cardiac enz .**
- **old LBBB + chest pain = Sqarbossa score دور علي دكتور قلب بسرعه**

Sgarbossa score : (positive if score > 3)+ cadiac enzymes.

- LBBB= concordant ST elevation ≥1mm in leads with positive QRS complex →Score5
- ST depression≥1mm in V1-V3 → Score 3
- Discordant ST elevation ≥5 mm in leads wih negative QRS complex→Score 2
  - **Discordant ST-segment ST:S ratio ≥0.25 in any lead**
  - **Arrythmia is common with inferior infarction**
- **لو ال STبتتحرك فى نفس اتجاه ال BBBسواء elevation or depressionيبقى اكتر من 1mmولو فى عكس الاتجاه يبقى اكتر من ربع ال S او 5 مربعات**

Topography:

- Septal → V1,V2 (put lead in 4th space not 2nd space)
- Anterior → V3,V4
- Antero-septal → V1,V2,V3,V4
- Lateral → V5, V6, I, aVL
- Antero-lateral → V3,V4, V5,V6, I, aVL
- Inferior → II, III, aVF.
- Posterior →V7,V8,V9 .



Management

➢ **STEMI:** لازم تروح القلب او شريف مختار تتحايل وتفرك عليها

1. 1st 3 hrs → (PCI & TPAor strept p(140))equal unless contraindication to TPA →surgeryالاغلب

   لو حسيت ان ال PCIهتتأخر اكتر من ساعتين من ال onset of painادي strept

2. 3-12 hrs→ best PCI " if not available whithin 120 mins "→strept 1.5million in 50 ml dextrose over 30 minutes ولو استخدمته لازم تجيب غيره حتى لو في رعاية تانية p(140)

3. 12-48 hrs →PCI

4. > 48 hrs →PCI if 1) symptoms or 2) hemodinamically unstable or 3) arrhythmias .

   ☞Dual anti platelets تمشي قد ايه Page 138

   ☞ successful streptokinase page 141

N.B. If PCI not available or streptokinase is absolutely contraindicated eg. عيان الجراحة → manage as NSTEMI. (If available NSTEMI معظم الـ)

Strept dose:1.5million Iu over 30 min ….strept vial اي تلاجه رعايه لازم يكون فيها

NB:

- **with PCI→ loading Plavix 600 mg 8 اقراص**
- **With thrombolytic (TPA/Strept)→loading Plavix 300mgاقراص 4 in age <75, 75 mg قرص واحد in age >75 ys**
- **Don't give perlique with streptokinase→severe bleeding**
- **Perlique (more superior for bleeding)**
- ***Ttt of STEMI=NSTEMI but with controloc infusion.***

➢ **NSTEMI:** 6 items

1- ABC 2- MONA (anti platelets , anti coagulants) 3- Statins

4 –Rate control 5- Prevention of remodeling 6 - ±Diuretics

Unless CI في اي ذكر للـ treatment قول

1. ***ABC:*** volume (very cautious), BP(levo), perfusion&Hb > 9 هام جدا (target is 9-10 or hematocrit 27-30).

2. ***MONA:***

♦ **Morphine**: the drug of choice for analgesia + venodilator → ↓ preload.

Dose of morphine :5-10 mg shot + mechanical infusion 1-5 mg/ hr

في الرعاية لو العيان sedated بنخليه زي ما هو علي fent

♦ **Oxygen supplementation**: only if SO_2 < 92%. Avoid hyperoxia as it increases mortality.

♦ **Nitrates**: **provided that BP is stable.** nitrates ممكن محطش Levo لو عيان في الرعاية علي

▪ Nitroderm patch: not preferred due to:

1- unpredictable absorption & (unstable في الـ heparin,insulin نفس نظرية الـ)

2-residual SC depot after removal → may aggravate hypotension if happened.

▪ Sublingual tablets: 3 times with 5 minutes interval (1 tab = 2.5 mg)منزلي.

▪ Tridil infusion: 0.5 - 2 ml/hr according to BP which should be monitored frequently.(preffered in uncontrolled HTN& HF)

احسن تمريض يمسك العيان ، تبليغ و مرور كل نص ساعة و تبص عليه بإستمرار

Advantage:

1-Once stopped, the effect stops due to rapid metabolism of nitroglycerin (1 minute).

2-steady blood level

Contraindications: Hypotension, right ventricle infract,PE, severe AS & HOCM.

DCL ,oliguric ,anuric or elevated creat. Ptمش بيدخلو القسطرة إلا لو الأهل مضو إقرار و غالبا مش بيحصل

♦ **Anti-platelets**: dual anti-platelets **يتاخدوا وانت واقف على الترولي** →

NB: If planned for PCI within 2-24 hours In high risk patient :

تروح بنفسك شريف مختار او حد كبير يكلم كبير

Indications of PCI :

- hemodynamic instability
- Acute heart failure
- Malignant v tach
- ST elevation not meeting STEMI criteria
- Chest pain refractory to medical therapy

❁*NB* in IHD if the pt has valvular lesion & coronary stenosis ⇨CABGالعيان يصلح الاتنين NOT for cathetrization.

▪ Aspirin: 150-300 mg loading then 75-100 mg/day.

Aspirin protect with gastritis as (NAC, K , Non steroidal).

If contraindicated (NPO or short bowel as perforated DU→ **IV Aggrastat.**

▪ Plavix☹ only if berlique is contraindicated Or not available

300 mg loading(unless >75 yrs old →give 75 mg) then 75 mg/day

▪ Berlique more superior , loading 180mg then maintainance 90mg/12 hrs

side effects →

1-poor compliance (1 tab / 12 hr)

2-dyspnea in (most common side effect)15-30% of the patients

3-Contraindicated with strept or triple antithrombotic therapy(warfarin,DAPT) (only with catheterization not with strept) .

4 –high bleeding risk patient

5-↑incidence of bleeding , don't give it with NOAC

▪ If you shift from berlique to plavix , reload Plavix والعكس صحيح

☞ Stop anti-platelets if platelet count < 30,000 , if less than 30,000 transfuse platelets first then continue

➢ Special situation in DAPT in p (138)

♦ **Anti-coagulant**: لازم وهو على الترولى قبل مايتنقل

-Therapeutic anticoagulation for 8 days **OR** revascularization (PCI,strept.,CABG)ايهما اقرب.

- Stable BP: clexane: 1 mg/kg/12 hrs according to actual body weight as p(41) .
- Unstable BP or ↑creatinine: heparin IV infusion
  (80-100 IU/kg(actual BW) IV bolus then 12 IU/kg/hr).
  Target PTT 40 - 70 p(42)..

هام if no available PTT → 1mg/kg clexane in renal patient 0.8 mg/kg in 120-150 kg, 0.7mg/kg in >150kg

If no available syringe pump → IV heparin 5,000 IU /4-6 hrs → PTT.

If BMI > 40 → IV heparin 7,500 IU/ 4-6 hrs monitor PTT.

Heparin dose in pulmonary embolism: 80 IU/kg IV bolus then 18 IU/kg/hr.

- Patients with low platelet count: Arixtra → (therapeutic dose in MI is 2.5 mg /24 hrs غريبة جدا

If PCI is planned give heparin bolus(ESC2020)

Its disadvantage is prolonged half life (has to be stopped 36 hrs before regional & 3 days before surgery

-heparin dose / kg depends on adjusted BW =ideal +0.4(actual – ideal)

. ***3. Statins:*** (Alt ,CK as basiline يستحسن يتسحب قبلها)

Acc to ASCVD (atherosclerotic cardiovascular disease) score if :

A) High risk ASCVD→High intensity statin therapy(stroke ,MI ,DM>40 yrs ,CKD)

B) Not high risk ASCVD→

>75ys consider high or modertate intensiy statins

≤75ys consider high intensity statins if not tolerated give moderate intensity

(ator 10-20 mg/day or crestor 10mg Zocor 20-40mg) .

▪ Higher-intensity statin therapy as 2nry prevention :

Atorvastatin (ator)40- 80 mg/day once

or Rosuvastatin (crestor) 20-40 mg /day once.

▪ Lower-intensity statin therapy as 1ry prevention :

➢Simvastatin (zocor) 10 mg/day or Ator 10-20 mg/day or Crestor 10 mg/day used when side effects develop from higher intensity statins in high risk patients.

e.g, Ator → preferred in renal impairment .

e.g, Crestor → preferred in cirrhotic patients with normal enzymes (cu كبده و كلاوي و) or up to 1.5 fold increase & in rhabdomyolysis.

In case of elevated liver enzymes → give half dose.or D.C statins .

➢In cases not well responding to statins →Inegy(Simvastatin 20/10 ezetimbie) or (40/10) decreae absorption of cholesterol.

- Side effects:1- muscle pain 2- weakness, could be severe 3- elevated liver enzymes.

▪ Recommended for all patients with MI (High intensity), irrespective of cholesterol concentration

N.B:لو جسمه كسَر Liponthal(lipatril)is not statin→↓cholesterol (finofibrate),↓triglycerides

Indication of statin

☞1- Diabetic patients aged >40 years & patients with2- CRFor 3-stroke should be maintained on statin therapy 4-IHD ☞ Diabetic patients aged <40 years :do lipid profile.

Contra-indication of statin

1- Active liver dis. 2-Rhabdomyolysis 3-Lactating 4-Pregnancy

4. Rate control: (4 +2NB→codarone ,types of inotropes) (واحد او اكتر من الاربعة)

Depend on1- contractility 2- BP(inotropes or borderline)-3- contraindication(AF مختلف عن ال

1- ♦ B Blockers :eg Concor, bisoprolol → contractility يعتمد على الضغط وليس

- Used cautiously in case of 1)poor contractility or
  2) recently weaned from inotropes →1) small 2) two divided doses
- In hemodynamically stable patient.
- Target HR: 50-60 bpm or below the trigger in stress ECG.
- Contraindications: in 1- shock,2- first degree HB,3- asthma الا لو ماشى عليها &4- obstructive pulmonary disease. – 5-HF e adequate BP → low dose

2- ♦ Procorolan (ivabradine):

- Dose: 5 - 7.5 mg /12 hrs.
- Given instead of concor in case of-1 borderline BP or2- hemodynamic instability.
- Blocks Na-K channels in SA node (funny channels) .
- Contraindicated in patients with 1- arrhythmias 2- pregnancy

3-interaction(Epantutin ,Pregnancy ,Arrhythmia ,Tegretol)

3- ♦ Lanoxin (digoxin):

- Works in bed-ridden patients (weak activity → (الاكشن هيبقي ضعيف لو عيان بيتحرك كتير

, will not control HR on its own

- If concor is contraindicated eg .shocked, or procrolan is contraindicated eg arrhythmia, pregnancy &interaction

- Used cautiously in

1. renal patients (adjusted dose with frequent digoxin level+ECG) 2. hypokalemia

4-CCB(isoptin) :in contractility >40 % + contraindication of BB except if shocked

Both(BB& CCB) are contraindicated *in shoc*

NB1:اقل في levo: tachycardia → لو هتختار منشطات يبقى ليفو

هام NB2: ♦ Cordarone: (⁎AF ⁎V. frequent extrasystoles)
may be added to lanoxin in rhythm other than sinus (lanoxin maintenance dose after
1-renal adjustment 2-should be halved.
*lanoxin & Marivan ينزل 2 دوا للنص الcordarone

5. *Prevention of remodelling*: *(1-ضغط-2 وكلى-3 وبوتاسيوم)* *if impaired contractility*

♦ **ACEIs (capoten or tritace)** or **ARBs** :all are taken once daily except capoten
→ keep your eyes on1- kidney,2- ↓BP (rate control has the priority)&3-↑ K.
In high creatinine →☠**Stop it** in CKD creatinine rise more than 50% from **baseline** or in AKI

Contraindicated in unstable patients.

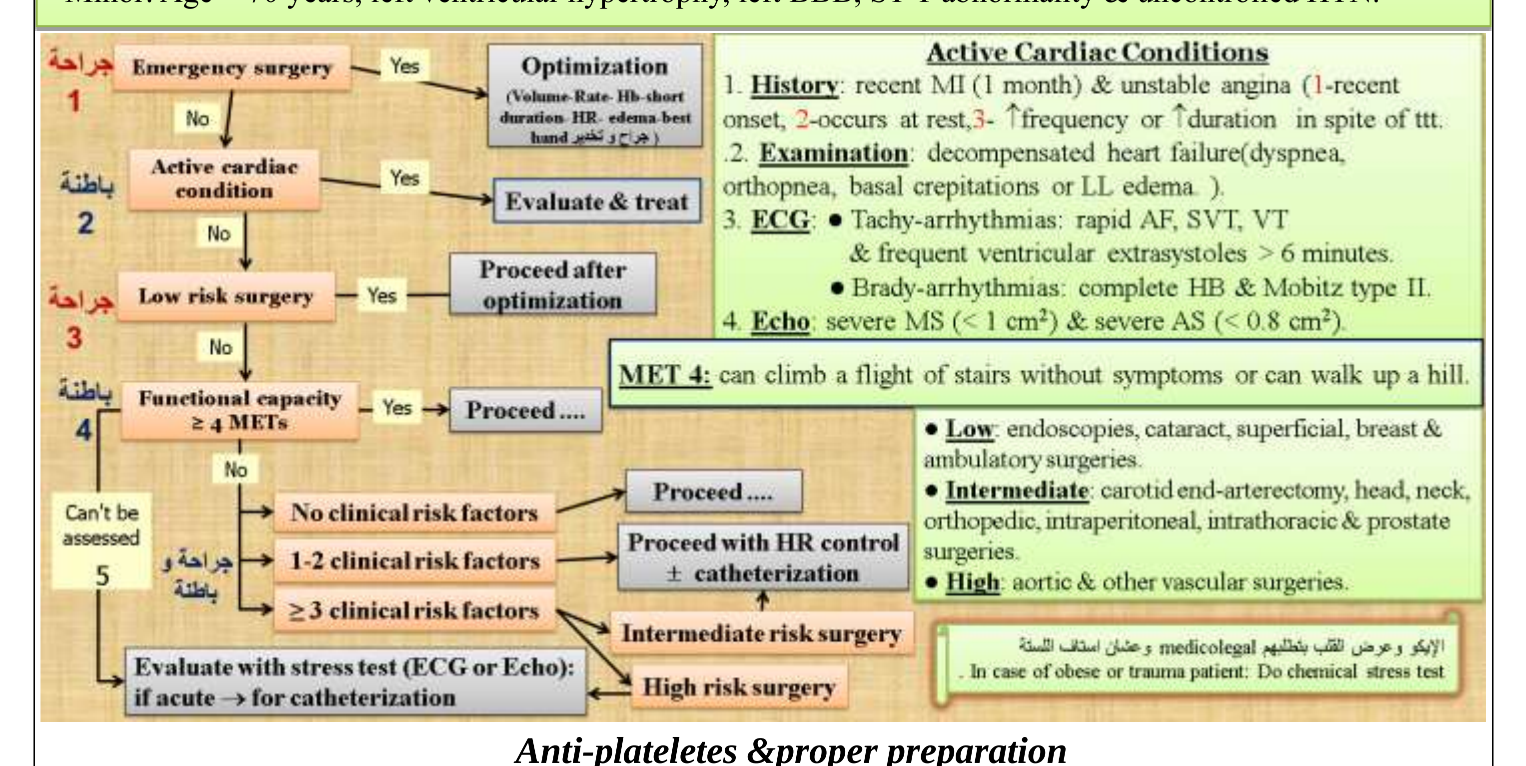
♦ **Aldactone (spironolactone):** if contractility 30-40 %
Gynecomastia (in males) is a side effects of aldactone.
Contraindicated in renal impairment (1- creat >3) ,2- K≥5
or **Aldosterone receptor antagonists (eplerenone):** alternative to aldactone.
no gynecomastia.
Recommended in patients with an 1- LVEF ≤ 30%, 2-heart failure or 3- diabetes as it reduces morbidity & mortality in those patients

6.± Diuretics : esp in LL edema .
7.ARNIAngiotensin Receptor –Neprilysin inhibitor ARN (Enteresto) p 137

.

Clinical risk factors

Major: Unstable or severe angina, recent MI, decompensated HF, significant arrhythmia, severe MS or AS.
Intermediate: History of IHD, compensated HF, cerebrovascular disease or renal impairment.
Minor: Age > 70 years, left ventricular hypertrophy, left BBB, ST-T abnormality & uncontrolled HTN.



Anti-plateletes &proper preparation

1-Balloon angio 3 wks

2-Metal 6 w - 3 mon.

3-Drug ablation 3-6 month

هوقف ال Plavix و أكمل Aspocid

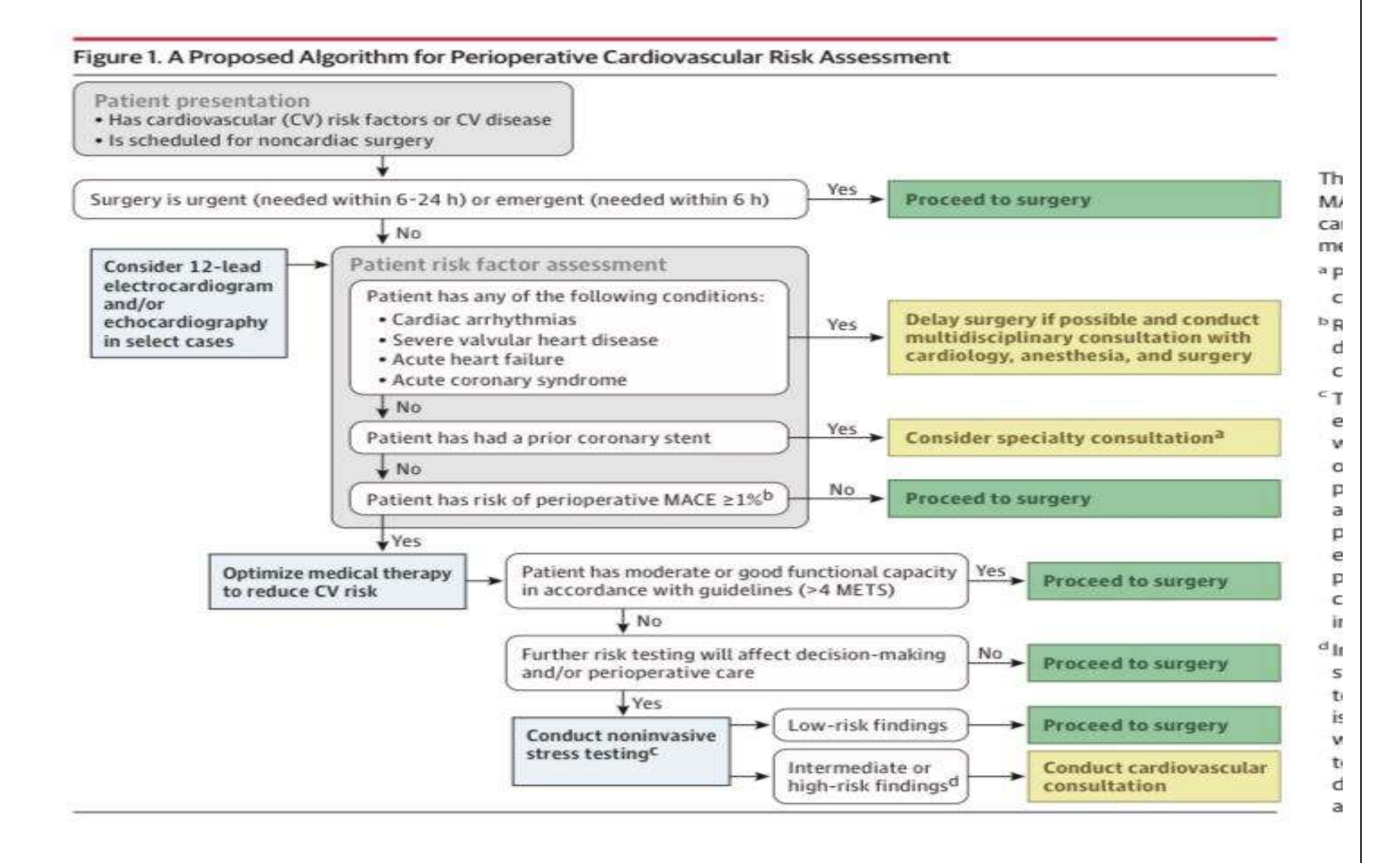
4-1year if emergency catheter.

لو عندي عيان 1- مش هيدخل عمليات يبقي ياخد DAPT لمدة سنة

2-هيدخل عملية Electiveو ينفع تتأجل ل 3 شهور و أوقف ال Plavix

-لو العملية مينفعش تتأجل ➲ لو لسه باديٍ DAPT على الأقل مش هيقف أول شهر Aspocid

➲1-3 شهور grey zone ممكن أوقف الPlavix و bridge to NOAC عشان يقف قبلها ب24-48 hrs



Definition of timing of surgery:

- **Emergency surgery:** Life or limb is threatened if not operated upon within 6 hours.
- **Urgent surgery:** Life or limb is threatened if not operated upon within 24 hours.
- **Time-sensitive surgery:** Delay of 1 week reevaluation would negatively affect outcome, e.g, malignancy.
- **Elective surgery:** Delay for up to 1 year.

Medications given in IHD (chronic patient as controlling)(H/O , examination &investigation)

1. Nitrates: dinitra for angina.
2. Antiplatelet 3-statins
4. Rate control.(after resuming oral feeding (واحد او اكتر من الاربع أدوية) (P102)
5. Prevention of remodeling(ACEI , ARBS or Aldactone).
6- .vastaril : in chronic patient if persisiting chest pain
(Crcl 0-30 contraindicated, crcl 30-60→ 1tab,crcl >60→ 1 tab /12hr)
7.ask cardiology for elective PCI.
8-PPI→high risk of GIT bleeding (ulcer,GERD,Dyspepsia,,…)
9.Forxiga(Dapagliflozin) :used in ttt of congestive HF even in non-diabetic pt. Reduce risk of HF hospitalization & death
10-±diuretics

- The most important 2 drugs in CPR →1- oxygen &2- adrenaline. ممكن يتاخد في الانبوبة

- During CPR → IV access through femoral (blind insertion) arterial or venous if no line If inotropes in peripheral line (donot interrupt CPR)

- To perform CT coronary angiography → HR should be around 60(علشان يلحق يقطع الصوره)
- Stop procorolan , concor , isoptin (48 hr), lanoxin (2 weeks) before stress ECG if you cant assess met , stress echocardiography or thalium study.

NB: STOP any drugs before electrophysiological study 5 days .
- Stress may be physical (treadmill) or chemical (dobutamine).
  Chemical stress is used in:1- bed-ridden ,2- morbidly obese patients & 3- بيدلع.
- In case of thrombocytosis (e.g, after spleenectomy) > 1,000,000 → give aspocid.
- Blood transfusion causes temporary ↑↑ TLC.

NB: patients whith HF on ACEI and still symptomatic ,can give them combination : Angiotensin Receptor –Neprilysin inhibitor ARNi{Enteresto}(sacubitril & valsartan) with the same precautions of ACEI and ARBS

Enteresto(50mg, 100mg, 200mg)/12hr

*✋Sacubtril:inhibit neprilysin (neutral endopeptidase) that induce vasodilatation & natriuresis

DURATION OF DAPT (DUAL ANTIPLATELETS THERAPY)

High bleeding risk (HBR) (ESC2020):

- Prior intracranial hge /lesion /stroke 6ms ago, Prior major trauma in last 30 days
- GI bleeding recently
- CKD<15ml/min/1.73m^2
- Plt<100000 or liver failure

Thrombotic risk (high)(ESC2020):

- Vascular disease اوعية مغلقة ,Recurrent MI, Premature CAD
- DM
- CKD(15-49 ml/min/1.73m^2)

Duration of DAPT:

1year regardless of stent type /medical or PCI except in case of high bleeding risk (as mentioned before) shortening of DAPT duration as follows:

1- Medical :aspocid +Plavix

- if for 1month(bleeding in the past month)continue Plavix only
- If for 3ms (HBR) continue aspocid alone

2-PCI: شكوته ايه عشان يتقسطر؟ a) ACS (MI)→ aspocid +plavix→6ms

b)stable for elective PCI (electively discovered H/O + exam+investigation) →aspocid +Plavix → 1-3ms if metal stent , 3-6ms if drug eluting stent

DAPT on top of long term OAC

- Default : aspocid +Plavix +OAC for 1 week then stop aspocid then after 12 ms stop plavix and continue on OAC only
- In high bleeding risk : aspocid +Plavix +OAC for 1 week then stop aspirin and after 6ms stop Plavix and continue on OAC only
- In high thrombotic risk :aspocid +Plavix +OAC for 1month then stop aspocid and after 12 ms stop Plavix and continue on OAC only
- In valvular AF : marivan+ aspocid +Plavix for 1 week then marivan+Plavix for 12 ms (INR 2-2.5)→marivan only

INTERRUPTION OF DAPT لو عيان أصلاً بياخد

1) ±OACwith bleeding events:

- Mild bleeding(no significant blood loss):
  - if on aspocid +Plavix+OAC remove aspocid (strept النزيف فيه عالي فمش بستخدمه مع الـ)
  - If on berlique shift to Plavix & stop aspocid
  - Shortening of duration of DAPT
- Moderate(significant blood loss but hemodynamically stable) to severe bleeding
  - Plavix only &reinitiate DAPT when controlled for shortened duration
    لو 48 ساعة و ال Hb مبينزلش
  - In patient with prothetic valve ,Stop OAC until bleeding controlled then reinitiate without aspirin
  - if persists stop all

2)If patient requires emergency or urgency (non cardiac surgery) →

- DAPT for at least one month, hold plavix and continue aspocid only + start NOAC as bridging (can be stopped 48 hrs) before surgery
- If before 1 month of stent insertion , bridging with IV antiplatelets
- Stop OAC 48 hrs before surgery then resume Plavix after surgery& aspocid

3)Interrupt if platelet count <30000 or platelets transfusion & continue .

THROMBOLYTIC THERAPY : 13 ITEMS

1-consent **2-consultation⇨ e.g neoro or cardio التخصص المطلوب**
3-±CVL before administration
4-indication **5-CI** **6-sensitivity**
7-AVIL **8-slouocortef** **9-Preperation**
10 –Dose & Duration **11-watch for complications**
12-success ??
13-when to resume therapeutic anticoagulant ??

1- **Consent**
2- **Consultation:** from cardiology in STEMI or pulmonary embolism and from neurology in ischemic stroke
3- **±CVL:** before administration
4- **Indication :**
  - **STEMI** within 1^{st} 3 hr (PCI ,TPA or strept are equal).3-12 hr (PCI superior)
  - **Pulmonary embolism :**
    *** Absolute indication (Heamodynamically Instability):**
      a)prescence of hypotension related to PE
    ***Relative indication :**
      a)Prescence of severe hypoxia
      b)Severe Rt side ventricular dysfunction
      c)Acute PE appear to be decompensated
        (↑cardiac enz (+ve troponin) +↑tachycardia)
      d)Free flating thrombus in rt atrial or ventricle
      e)Extensive clot burden (severe Pul. HTN) diagnosed by CT angio.
  - **Ischemic Stroke** in 1^{st} 4.5 hrs (TPA)

5- Contraindication

Absolute CI:

1. Previous intracerebral Hge
2. Cerebral vascular lesion
3. Intra cerebral neoplasm .
4. Ischemic stroke < 3months
5. Significant closed head or facial trauma last 3 months
6. Active bleeding

(1–5) بتوع المخ

Relative CI:

1. Severe uncontrolled hypertension . [systole >180, diastole >110]
2. Stroke , major surgery , major trauma > 3months
3. Recent internal bleeding < 1 months
4. Non compressible vascular (arterial) puncture
5. Pregnancy
6. Age > 75 yrs
7. Active peptic ulcer
8. Diabetic retinopathy
9. Current use of anti coagulation (therapeutic) / INR > 1.7 / PT > 15 sec .

6- Sensitivity :mostly with strept. **7- Avil** **8-Soluocortif**

9-Preparation :

a)Strept : 5سم ينزلوا على الجدار من غير ما يترج(تفركه بين ايدك) ولا يعمل رغاوى وبعدين يتحط على

a) 150 cm in PE على سولوسيت b)50 cm in MI ب 180 جنيه

b)TPA (vial 50 mg) ال1vial- زجاجة بودرة 2- زجاجة مذيب 3-وصلة <u>It should be protected from light</u>

*تاخد سرنجتين 50 سم تدى 15 سم bolus وبعدين 50 سم على مدارساعه وبعدين 35على مدار ساعه يعنى الأمبول ب100 مل ب 6000 جنيه

10-Dose &Duration :

a) Strept in STEMI :

1.5million in 50 ml dextrose over 30 minutes

Start gradually as rate 10 ml / hr if no reaction 100 ml /hr

b)Strept in PE :

1- Rapid infusion 1.5 million over 2 hrs most commonly used in unstable or

2-Slowly 250000 IU over 30mins then 100000IU /hr for 24-48 hrs

(*after dilution in 5 ml dextrose put it in soluset 150 ml then start infusion 25 ml/30mins then 10 ml /hr for 24-48 hrs)

c)TPA in PE: 100 mg over 2 hrs⇨ **15ml bolus+ 50ml over 1 hr then 35 ml over 1 hr**

d)TPA in stroke: 0.9 mg /kg maximum 90 mg over 60 mins.. **مفيش strept فى الstroke**

e) TPA in STEMI: 100 mg over 2 hrs

11- complication : Hge

12-Success of thrombolytic therapy :

- In STEMI →ST ↓ 50% from baseline (follow up ECG 60-90 mins after administration

→if successful : catheterization within 24 hrs

→if failure : urgent catheterization

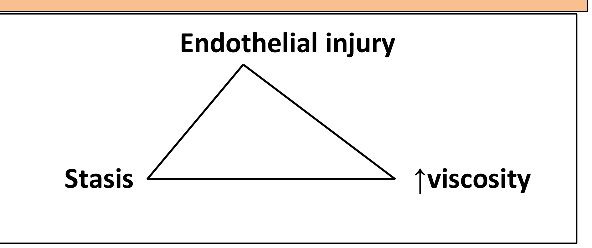
-In stroke : improvement of neurological deficit .

-pulmonary embolism : hypoxia improvement , ↓strain ,↓pulmonary pressure

13-When to resume therapeutic anticoagulant ?

When PTT less than double fold

PULMONARY EMBOLISM



Suspected if hypoxic patient with (vircow triad)

- Endothelial injury.
- Stasis (fracture with or without surgery)
- ↑ viscosity (cancer & poor hydration)

Revised Geneva score for prediction of PE:

(1) dyspnea, 2) tachypnea 3) unexplained hypoxic 4) un explained chest pain

(عيان فى واحده منهم)

< 2 → low risk ... 2-4 → Intermediate risk ... > 4 → High risk

History: - Definitive DVT or pulmonary embolism (duplex) **(1)**
- **H**emoptysis **(1)**
- Cancer**(1)**
- **age >65 years (1)**

Examination :- HR: < 95 **(1) ...** > 95 **(2)**
- Unliateral pain **(1)** or odema **(1)**
- Surgery or fracture **(1)**

Diagnosis of pulmonary embolism:

- **If the patient is hemodynamic stable :**

-Low or intermediate clinical propability<4 →D-Dimer will be done (good –ve)± duplex.
- If negative → free
- If positive → CT pulmonary angio → +ve PE .

- High clinical probability>4 → CT pulmonary angio ± duplex.
- If positive → PE confirmed
- if negative → PE excluded

- **If the patient is hemodynamic unstable:**
  - Fit for transportation ***(ينفع يتنقل)*** :
    -CT angio if available
    -If not available CT perform Echo→1-Rt side dilated> LT side with flattened septum in short parasternal axis &2- distended IVC in subcostal view = PE (without CT angio)
  - Critically ill and high clinical probability →Echo :Rt side dilated = PE

Treatment:

1- Difinitive + ABC

2- a) If the patient is unstable & hypoxic → primary reperfusion with:

a) Systemic thrombolysis p()

1- TPA(superior) 100mg over 2 hrs or

2 → a) Rapid infusion 1.5 million over 2 hrs

→ b)Slowly Strept 250000 IU over 30 minutes then 100000 IU/hr for 24-48 hours.

Relative indications : a) Rt ventricular strain dysfunction

b)Free floating thrombus c) Extensive clot burden (in CT angio.)

d)severe hypoxia e) +ve troponin

☞when PTT becomes less than douple fold →

if still unstable start heparin infusion (80units /kg bolus then

18 units /kg/hr (PTT/6hrs) if PTT is not available

Until patient become stable shift to LMWH therapeutic dose p(38)

☞ if thrombolytic therapy not available or contraindicated consider heparin infusion

(80units/kg bolus then 18 unit /kh/hr (PTT/6hr)

*STEMI=NSTEMI لو مفيش قسطرة يبقى

b)Surgical embolectomy (cardiothoracic)

c)catheterization →mechanical

→local injection of TPA

- *b)*If stable : therapeutic anticoagulation p(39)

Consider thrombolytic if no CI esp. if there is high risk (troponin +ve)

Prophylactic : IVC filter(retrievable is better than permanant) used in case of DVT with:

- 1-Showering on therapeutic anticoagulation
- 2-Anticoagulation is contraindicated
- 3-Patient needs urgent surgery ومش هيقدر يستحمل لحد ماتلزق او تدوب

➢ هام جداIn any pulmonary embolism →Ask for troponin →If positive or Rt side strain →consider thrombolytic therapy p(140)

ARRHYTHMIA

Arrhythmia: 1-bradycardia(HB ,Mobitz type II), 2-SVT 3-AF 4-VT

Causes of arrhythmias (*2D , Neuro , blood gases components)*

1) Diseases:

- ♦ Cardiac:
  - Ischemia
  - Pericarditis, myocarditis & infective endocarditis
  - RHD
  - Conduction abnormalities
- ♦ Non-cardiac:
  - Hypo/Hyper-hormones → e.g, hyperthyroidism, myxedema & pheochromocytoma.
  - Sepsis.

2) Drugs

- ♦ Anesthetic drugs → e.g, halothane.
- ♦ Non-anesthetic drugs: a - Parasympathomimetics & Sympathomimetics.
  b- Parasympatholytics & Sympatholytics.
  c- Anti-arrhythmic drugs → as propafenone (Rytmonorm).

3) Neuro

- ♦ Surgical stimulation of areas rich in nerve supply:1- perineum,2- ear,3- nose 4- carotid body 5-cervix 6-peritoneum
- ♦ Central: tumor, trauma & hemorrhage.
- ♦ Peripheral: pain , urinary bladder retention , cervix & peritoneum .

4) Blood gases abnormalities

- ♦ pH: acidosis or alkalosis
- ♦ Oxygen & CO_2 abnormalities
- ♦ Electrolyte disturbance
- ♦ severe anemia, hypoglycemia,hyper or hypothermia , hypovolemia.

Common Causes of sinus tachycardia in ICU: (5 items)

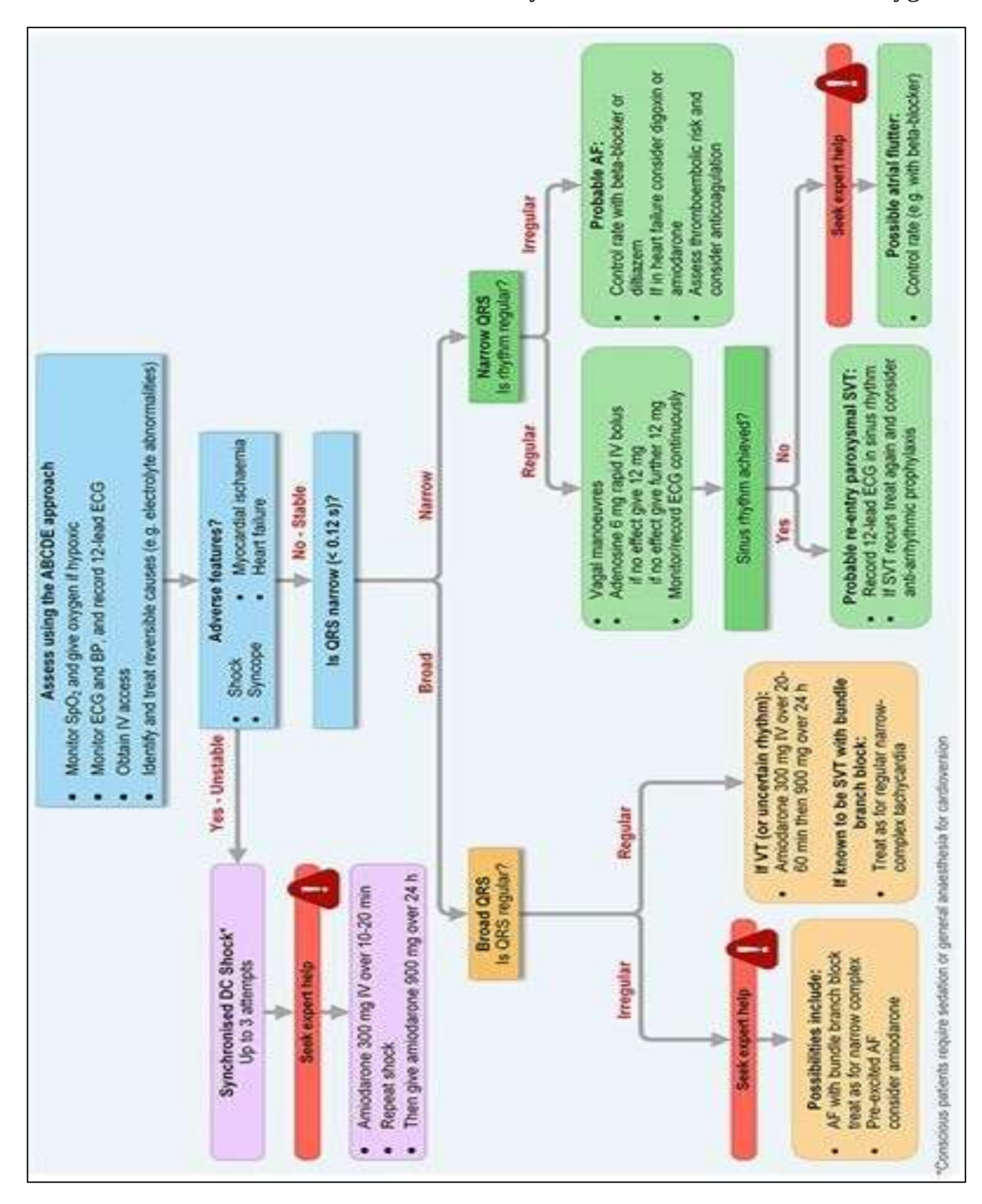
1)Pain
2)Volume
3)Electrolyte
4)Hyperthermia
5) sepsis
6)Others نص الصفحة العلوى

TACHY-ARRHYTHMIA

Initial Management

♦ ABC

♦ 1. 12-leads ECG 2. ABG 3. Electrolytes 4. IV access 5. Oxygen



A B C D : (CI)

- Side effect of Adenosine → bronchospasm.
- Beta blockers are contraindicated in asthmatic Patients(except IHD on BB).

CCB CI

- In case of local anesthetic toxicity presented tachy-arrhythmia → Never give CCB.
- CCB should not be given in a patient with EF< 40%.
- DC of a patient with sinus tachycardia → worsen the condition. (don't give cordarone)
- DC shock should be preceded with sedation & analgesia (dormicum & fentanyl).

لو شكيت ان العيان arrestedأبدا CPRماتحتش فى ساعه

Shockable rythms :

- Once recognized shock as early as possible
- Charge while paddles in place don't waste CPR time and charge on patient
- If on bag to mask ventilation remove O_2 .

***Pulseless VT or VF:**

- Start CPR→DC →2nd CPR→DC→3rd CPR→DC →Cordarone 300mg shot and adrenaline 1mg shot →4th CPR→DC→Then continue CPR followed by DC if still shockable rhythm and give adrenaline every 2 cycles (i.e. after 5th, 7th ,9th ,…),cordarone may be repeated 150mg in resistant cases .

3 لسعات ساده + دوايين وبعدها ادرينالين مره اه ومره لاء

- Lidocaine 1-1.5mg /kg upto 3mg/kg if cordarone not available
- Sodium bicarbonate 50ml of 8.4% in case of hyperkalemia ,PH<7.1, TCA toxicity(tricyclic antidepressant).
- Mgso4 2gm in torsade de points

Pulsed VT if unstable→DC

If stable :Amiodarone 150 mg iv over 10 min , repeat as needed to maximum dose 2.2 g in 24 hrs . Prepare for elective synchronized cardioversion .

Doses/Details

Synchronized cardioversion:
Initial recommended doses:

- Narrow regular: 50-100 J
- Narrow irregular: 120-200 J biphasic or 200 J monophasic
- Wide regular: 100 J
- Wide irregular: defibrillation dose (*not* synchronized)

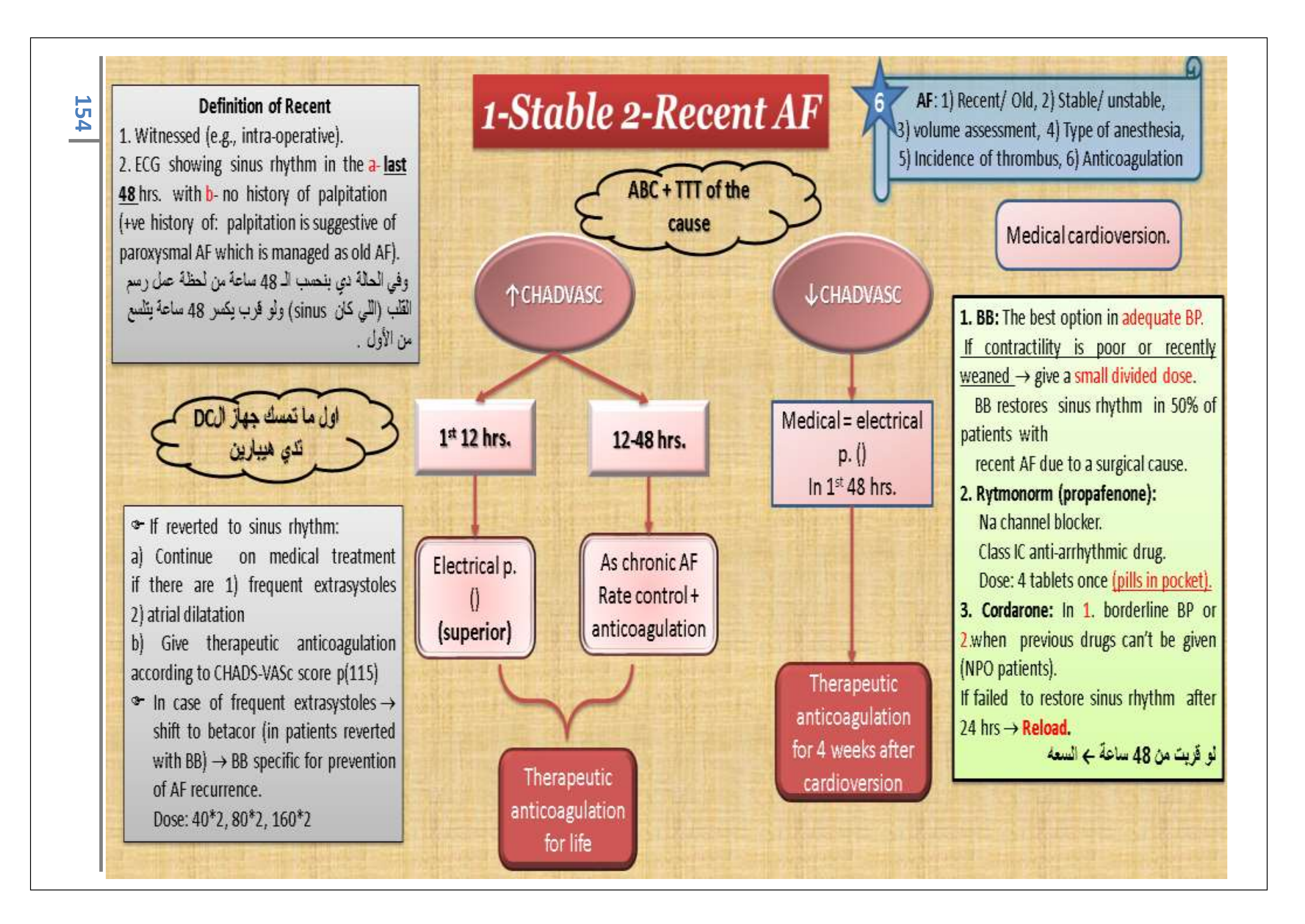
Adenosine IV dose:
First dose: 6 mg rapid IV push; follow with NS flush.
Second dose: 12 mg if required.

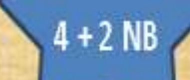
Antiarrhythmic Infusions for Stable Wide-QRS Tachycardia

Procainamide IV dose:
20-50 mg/min until arrhythmia suppressed, hypotension ensues, QRS duration increases >50%, or maximum dose 17 mg/kg given.
Maintenance infusion: 1-4 mg/min.
Avoid if prolonged QT or CHF.

Amiodarone IV dose:
First dose: 150 mg over 10 minutes.
Repeat as needed if VT recurs.
Follow by maintenance infusion of 1 mg/min for first 6 hours.

Sotalol IV dose:
100 mg (1.5 mg/kg) over 5 minutes.
Avoid if prolonged QT.


1-Stable 2-Recent AF
6
AF: 1) Recent/ Old, 2) Stable/ unstable, 3) volume assessment, 4) Type of anesthesia, 5) Incidence of thrombus, 6) Anticoagulation
Definition of Recent
1. Witnessed (e.g., intra-operative).
2. ECG showing sinus rhythm in the a- last 48 hrs. with b- no history of palpitation
(+ve history of: palpitation is suggestive of paroxysmal AF which is managed as old AF).
وفي الحالة دي بنحسب الـ 48 ساعة من لحظة عمل رسم القلب (اللي كان sinus) ولو قرب يكسر 48 ساعة بنلبع من الأول .
ABC + TTT of the cause
↑CHADVASC
↓CHADVASC
اول ما تمسك جهاز الDC تدي هيبارين
1st 12 hrs.
12-48 hrs.
Electrical p. () (superior)
As chronic AF Rate control + anticoagulation
Therapeutic anticoagulation for life
Medical = electrical p. () In 1st 48 hrs.
Therapeutic anticoagulation for 4 weeks after cardioversion
Medical cardioversion.
1. BB: The best option in adequate BP.
If contractility is poor or recently weaned → give a small divided dose.
BB restores sinus rhythm in 50% of patients with recent AF due to a surgical cause.
2. Rytmonorm (propafenone):
Na channel blocker.
Class IC anti-arrhythmic drug.
Dose: 4 tablets once (pills in pocket).
3. Cordarone: In 1. borderline BP or 2.when previous drugs can't be given (NPO patients).
If failed to restore sinus rhythm after 24 hrs → Reload.
لو قربت من 48 ساعة ← السعة
If reverted to sinus rhythm:
a) Continue on medical treatment if there are 1) frequent extrasystoles 2) atrial dilatation
b) Give therapeutic anticoagulation according to CHADS-VASc score p(115)
In case of frequent extrasystoles → shift to betacor (in patients reverted with BB) → BB specific for prevention of AF recurrence.
Dose: 40*2, 80*2, 160*2



1- Stable 2-Chronic AF

Old > 48 hrs

ABC + ttt of cause p(110) (DD&TTT)

a) Target: Rate control < 110 bpm

*b) ± anti-coagulation according to **CHADS-VASc** score or moderate **or** severe mitral stenosis **RHD**.*

Drug selection depends on BP & contractility (BCD) oral or IV

1. BB: the best option in adequate BP.

If contractility is poor or recently weaned from inotropes → give a small divided dose. a • Oral: concor.

b • IV: Inderal → titrated up to 6-8 mg. (amp 1mg)

متنيش في اللستة أكثر من 3 أمبولات

2. CCB: in adequate BP **plus** good contractility esp. in asthmatic pt

Isoptin (verapamil): a)2.5-5 mg IV over 2 minutes(amp 5mg).

Additional dose of 5-10 mg maybe given after 15-30 minutes max 20mg. B) Oral: 80-160 mg /8 hrs.

3. Digoxin (Lanoxin)(oral & IV)(amp 0.5 mg)

First choice in1. borderline BP (عشان مش بيرد العيان) &2. poor contractility that can't tolerate adequate dose of BB (added to BB) or bed ridden patients.

Loading: 1 – 1.5 mg over 24 hrs. ... Maintenance: 0.25 mg/day.

4. Cordarone (amiodarone): in borderline BP or poor contractility that can't tolerate adequate dose of BB (added to BB) .

هام جدا ☞ If BP become stable → add BB, stop lanoxin & cordarone to avoid their numerous adverse effects.

☞ Never give the 4 drugs together, otherwise irreversible cardiac arrest may occur. Cordarone or Lanoxin after BB depend on CI.

NB: 1- Incase of inotropic support: levophed is preferred than adrenaline

2- Procrolane is contraindicated in AF

جرعة صغيرة متقسمة لو ال BP borderline, poor contractility, recently weaned

+ جرعة عالية لو ضغط حلوين contractility

ضغط + contractility حلوين

- ضغط وحش
- خايف من الكلي
- البوتاسيوم واطي

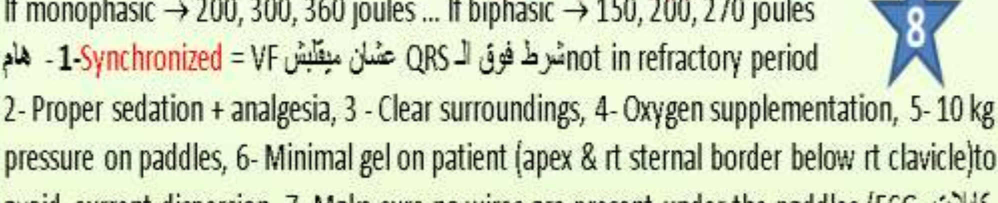
ضغط وحش خصوصا لو كلي

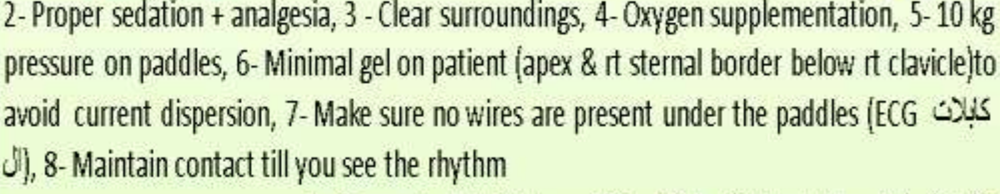
Persistent suspect cause not controlled

1-Unstable AF

📋 **Signs of instability:**

1. SBP < 90 or MAP < 65 mmHg/ ↓ BP 40% from baseline in hypertensive pts., shock
2. Cardiac ischemia : chest pain, ECG changes, MI, ↑ cardiac enzymes or pulmonary edema.
3. Cerebral ischemia: DCL.





2- Recent < 48 hrs

ABC + ttt of cause(DD&TTT) p(110) + Heparin if possible unless contraindicated

a) Target: Restore sinus rhythm, DC shock ± drugs

b) ± anti-coagulation according to <u>CHADS-VASc</u> score OR in moderate or severe mitral stenosis <u>RHD.</u>

A. DC synchronized cardioversion: اول ما تمسك جهاز الDC ادي هيبارين

If monophasic → 200, 300, 360 joules … If biphasic → 150, 200, 270 joules

هام - **1-**Synchronized = VF عشان ميقلبش QRS شرط فوق الـ not in refractory period

2- Proper sedation + analgesia, 3 - Clear surroundings, 4- Oxygen supplementation, 5- 10 kg pressure on paddles, 6- Minimal gel on patient (apex & rt sternal border below rt clavicle)to avoid current dispersion, 7- Make sure no wires are present under the paddles (ECG كابلات ال), 8- Maintain contact till you see the rhythm

علشان لو لسه **shockable** بتلسعه تاني و تالت و بعدين تبدا **medical** و تلسعه

B. Cordarone: 300 mg + correction of reversible causes mainly K & Mg.

C. DC (4th): 360 joules if monophasic or 270 joules if biphasic.

D. Cordarone 900 mg over 24 hrs, you may reload IV then continue oral or IV (page 116)

E. هام In AF resistant to DC & cordarone: **consider control of source of sepsis or other causes** هام جدا

& add lanoxin to cordarone.

F. If reverted to sinus rhythm after DC continue cordarone if there are

1) <u>frequent extrasystoles</u> 2) <u>atrial dilatation</u>

Give therapeutic anticoagulation according to CHADS-VASc score:

for 1 month لو قليل, For life لو علي

G. If reverted to sinus rhythm after DC then AF recurred → DC shock again بالسعة اللي رد بيها + Reload cordarone & then maintenance (high dose400×3).

2- Old > 48 hrs

ABC =ttt of cause(DD&TTT) p(110)

a) Target: Rate control < 110 bpm

*b) ± anti-coagulation according to **<u>CHADS-VASc</u>** score.*

*Or moderate or severe mitral stenosis **<u>RHD</u>***

Rapid (> 110 bpm)

The same as recent.

Even if showering.

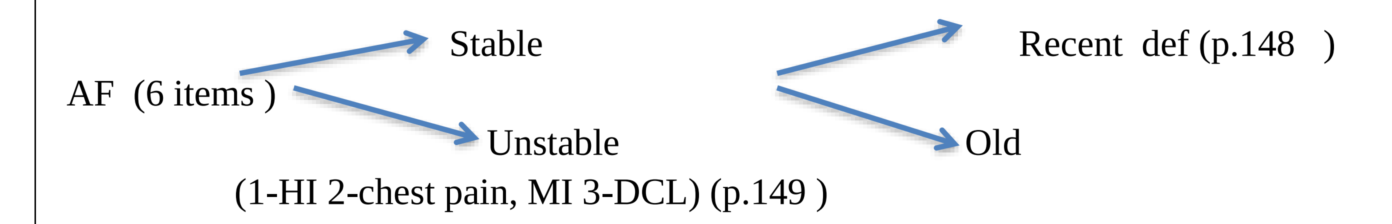
Give IV heparin (5000 units) before DC.

Slow (< 110 bpm)

Conservative: maintain rate control by cordarone **or** lanoxin **or** both.

After stabilization of BP → shift to BB for rate control gradually.

في حوادث النسا لو الأم دخلت في AF اصبر ع cordarone لحد ما الواد يخرج (clamp umbilical vein) وبعدين اديه عشان ميجيلوش hypothyroidism & mental retardation وتعرف الأم مترضعش ابنها .علشان متحكش علي الواد يمشي علي Eltroxin for life



(1-HI 2-chest pain, MI 3-DCL) (p.149)

+4 items dependant on mitral valve area ⇨degree of stenosis

- Fluid management:حكيوة عيانة النسا بقللت بعد ازازة محلول
- Type of anaesthesia:RA>>CI in severe valvular
- Incidence of thrombus
- Anti coagulation →NOAC contra-indicated in severe valvular
  ↳ marevan

☠ HR عن طريق السماعة or ECG NOT radial or pulse oximeter

☠ score ال ب تَجُبْ RHD.

➢أي عيان unstable rapid AF بيتلسع بغض النظر عن ضغطه حتي لو 140/80

<table>
<tr><th>Points</th><th>CHADS-VASc Risk Criteria</th><th>CHADS-VASc Score</th><th>Recommendation</th></tr>
<tr><td>1</td><td>Congestive HF</td><td rowspan="5">0-1
لو مش هيترد ⇨Recent or old :
No need
لو هيترد ⇨Old 3wks before &4wks after
or TEE & 4wks after.
⇨Recent 4wks after</td><td rowspan="5">None</td></tr>
<tr><td>1</td><td>Hypertension</td></tr>
<tr><td>2</td><td>Age ≥ 75 years</td></tr>
<tr><td>1</td><td>Diabetes</td></tr>
<tr><td>2</td><td>Stroke/Thromboembolic event/TIA</td></tr>
<tr><td>1</td><td>Vascular disease:
MI / PAD / Aortic plaque</td><td rowspan="3">≥ 2 in males
≥ 3 in females
Recent , Old : for life</td><td rowspan="3">Therapeutic anticoagulation</td></tr>
<tr><td>1</td><td>Age 65 - 74 years</td></tr>
<tr><td>1</td><td>Sex category: Female sex</td></tr>
</table>

☞Recent AF e ↓CHADVASC→ after electrical or chemical cardioversion give therapeutic anticoagulation for 4 weeks & heparin before

☞Old stable AF e↓ CHADVASC → 3 wks before & 4wks after or TEE before &4 wks after.

☞ single attack of AF e ↑CHADVASC → give therapeutic anticoagulants for life

NB:

☞Any electrical cardioversion either 1- recent or old 2-stable or not → give heparin before cardioversion unless contraindicated or on anti-coagulation 4 wks before.

☞1-Moderate and severe mitral stenosis 2-e sinus rhythm and 3- embolic event →Therapeutic for life

	Malignancy & pregnancy	1)Prosthetic valve 2) moderate or severe MS, 3)mural thrombus 4)Epanotin & tegretol 5)berlique	Others
Heparin & LMWH	✓	✓	✓
Marivan	✗	✓	✓
NOAC	✗	✗	✓

☞ Target INR in AF patients on marivan is 2-3.

☞ ***Patients with chronic controlled AF*** can be cardioverted to sinus rhythm either:

- Immediately provided that 1) no atrial thrombus by TEE.

or
- After 3-4 weeks on therapeutic anticoagulation.

Therapeutic anticoagulation should be continued after cardioversion **for life** in high score (with score ≥ 2 in males or ≥ 3 in females) or **for 4 weeks** only in lower scores.

☞Eliquis: start with 5mg /12hrs if →high score for life or
→recent, stable, cardioverted with low score 4wks.

☞ Xarelto:In AF 20 once if if →high score for life or
→recent, stable, cardioverted with low score 4wks.

NB:4 items

In any patient with AF search for : Mitral vave area :tight or not (according to severity it will affect :

4 اسئله لازم ينوروا فى دماغ حضرتك☼

a) Fluid management (restrict)
b) Type of anesthesia(regional or general) general is preferred, regional CI in moderate/severe
c) Incidence of thrombus will be increased if small area
d) Anticoagulation : in moderate or severe mitral stenosis→ marivan not NOAC (therapeutic anticoagulation acc to CHAD-VAS

☞ ***Cordarone (amiodarone)***

- ***Pharmacology:*** class III anti-arrhythmic drug (mainly potassium channel blocker).
- ***Loading dose:*** could be up to 10 gm in 70 kg patient.

It includes:

1) ***IV:*** 5-7 mg/kg IV over 30 min then 50 mg/hr to max 1gm over 24 hr
(roughly 3amp (300-450 mg) over 30 min then 6 amp(900mg)on 50 ml saline – rate 2 over 24hrs)
IV dose could be repeated provided that max. dose/day 1200mg

2) Oral or IV(in case of خفيفه extrasystole or LA dilatation):

A) 200 mg tab/8 hrs for 30 days (18 gm / month) 1 x 3 x 30 , then 200 mg tab daily

B) In case of very frequent extrasystoles/paroxysmal AF → rapid oral loading: 400 mg tab /8hrs for 15 days , 2 x 3 x15 .

for total loading dose 10 gm

if chronic AF: 300 mg (2-3 amp.): if controlled , 200/24 hr→rate control dose don't change it to sinus .

if not controlled 900mg→a- if controlled 200/24h + IV could be loaded

b- if not controlled manage as recent AF400/8hr once rate is controlled 200/24hr

- ***Maintenance dose***: 200 mg tab /24 hrs.
- ***Bioavailability of oral cordarone is 50 %.***

If oral intake is contraindicated (short bowel or NPO) :اللي العيان كان ماشي عليها half dose

If 200mg/8hr➢150mg/12hr 400mg/8hr➢150mg/6hr

- If given with lanoxin, the required lanoxin dose should be decreased by 25-50%.
- Cordarone has no role in rate control of sinus tachycardia as DC(MI ذكرت فى ال).
- ***Advese effects: لو أمكن نستخدم حاجة تانية نوقفه***
  1) Thyroid dysfunction 2) IPF 3) Corneal deposits 4) Teratogenicity
  5) Thrombophlebitis. 6) Interaction :↓ dose of lanoxin & Marivan 50% هام جدا

☞ Mothers must not lactate their infants after cordarone administration (even a single dose) → hypothyroidism ... Half life: 50 days (pump & dostinex 2 tab 1st day , if she started lactation 0.25 mg /12 hrs for 2 days). Cordarone given after clamping the cord

*لو كملت عليه مفيش رضاعة

☞ ***Lanoxin (digoxin)***

- A drug with a narrow therapeutic window, i.e, toxicity occurs easily & close monitoring is mandatory especially in renal patients (1-bradycardia,2- sagging of ST segment &3- lanoxin level) esp with hypokalemia.
- Renal pt with hyperkalemia >>Calcium is contraindicated.except after lanoxin level.
- A weak drug → used in bed ridden patients ... inefficient in active patients.
- Use half maintenance dose when added to cordarone هام. normal dose = 0.25mg/day
- In renal patint : adjust lanoxin dose a) according to creat. Clearance with close monitoring (ECG & Lanoxin level) then b) reduce the adjusted dose by 50% in patient using cordarone.
  - Hypokalemia will exaggerate the toxicity .

☞ ***Marivan (warfarin)+bridging p(111) till INR 2-3,interaction, dose ,toxicity***
(clexan + marivan then withdraw clexan when INR 2-3

- A drug with extensive drug interactions:

↑ marivan effect → **C**ordarone, **D**iflucane, **D**aktarin oral gel, **E**ltroxin, **E**panutin (early).

↓ marivan effect→ **D**iet (green vegetables rich in vitamin K) & **E**panutin (after 2 weeks).

- هامDepends on shopping containers

كل علبة دواء جديدة بنفس التركيز ممكن تدي تأثير مختلف فلو العيان مظبوط علي جرعه معينه لما العلبة تخلص ويجيب علبة جديدة و يكون INRمظبوط على جرعة ممكن يعلى أو يوطي على العلبة الجديدة رغم إنها نفس التركيز

ف كل علبة جديدة نعملINR جديد

- Not used in patients with malignancy & pregnancy → give clexane, heparin or Arixtra.

هام جدا ● In ICU patients indicated for therapeutic anticoagulation → use clexane or heparin. Shift to marivan only when preparing for discharge from ICU.

علشان لو هيتعمله procedure فى الرعاية او العمليات يدخل بسهولة

جدا : Initiation of warfarin :5mg for 3-5 days then repeat INR

و تعدّل على حسب الجدول اللي على اليمين P( )

Codarone ↓dose of Marivan 50%

☞**warfarin toxicity** — Bleeding (vit. K & plasma)
No bleeding acc. To INR→4-6 3mg
→ INR >6 & risk of bleeding IV 3mg vit.K or oral 10 mg & follow-up

☞ ☞ ***New oral anticoagulants (NOACs):*** (Sometimes increase LFTs).

-Expensive - administerated without bridging with parentral. (1st dose stop clexan)

Therapeutic anticoagulation should be continued after cardioversion **for life** (with score ≥ 2 in males or ≥ 3 in females) or **for 4 weeks** only in lower scores

- Apixaban (eliquis), Edoxaban & Rivaroxaban (xarelto) → anti-factor X.
- Dabigatran (pradaxa) → anti-factor II.
- Not used in patients with1) malignancy, 2) pregnancy,3)mechanical valve & 4)moderate to severe mitral stenosis 5)Epanutin 6)mural thrombosis 7)berlique
- Contraindicated with renal impairment except for apixaban(Eliquis)or xarelto can be given in crcl 15-30) (allowed even in ESRD).
- Apixaban (eliquis) dose:In DVT & embolism : 10 mg /12hrs for 1 week then 5mg /12hrs 3-6 Months

In AF :start with 5mg /12hrs if →high score for life or
→recent, stable, cardioverted with low score 4wks

NB: Half dose if score ≥ 2 (2.5 mg/ 12hrs) :
اللى وزنه اقل من 50 او سِنه اكتر من 80 لازم ننبه عليهم يعملوا creatك شويه و يشرب سوايل كتير.
Contraindicated in Crcl <15

- Xarelto: in DVT & PE dose:15mg /12 hrs for 3 weeks 20mg /day for 3-6 mon.
  In AF 20 mg once if →high score for life or
  →recent, stable, cardioverted with low score 4wks
  CrCl 15-49 in any indication 15 instead of 20.

Supraventricular Tachycardia

☞ **ABC + reversible causes**

- Unstable →→ DC shock (with half dose of joules in AF).with same precautions+ same drugs.
- Stable →→→ **C**arotid massage(except in old age,valsalva is better), **A**denosine, **B**B, **C**CB, **C**ordarone, **D**igoxin (According to BP & contractility)

Heart block :

-1st degree →no treatment unless prolongation of PR interval >400ms or rapidly evolving

-2nd &3rd degree→atropine 500mcg iv up ro 3 mg , isoprenaline 5mcg/min, adrenaline 2 mcg /min or pacing

Maintenance of cordarone in V tach. VF=720mg/day = 30mg/hr = 0.5 mg/min

5أمبولات على 50مل ملح بRate2 لمدة أسبوعين

How to Switch Between Anticoagulants

From	To	How to switch
Heparin	NOAC	Start NOAC at the time of heparin discontinuation
LMWH / fondaparinux	NOAC	Stop LMWH / fondaparinux and start NOAC ≤ 2 hr before next scheduled LMWH/fondaparinux dose
Warfarin	NOAC	Stop warfarin and start dabigatran/apixiban when INR < 2.0 Stop warfarin and start rivaroxaban when INR < 2.5
Dabigatran	Warfarin	CrCl > 50ml/min: start warfarin 3 days before stopping dabigatran CrCl 31-50ml/min: start warfarin 2 days before stopping dabigatran CrCl 15-30ml/min: start warfarin 1 day before stopping dabigatran CrCl <15ml/min: no recommendations provided
Rivaroxaban Apixaban	Warfarin	Start warfarin with rivaroxaban/apixaban until INR ≥ 2.0 and then stop rivaroxaban/apixaban (INR testing should be done just before rivaroxaban/apixaban dose)
NOAC	Parenteral anticoagulants	Stop NOAC and start parenteral anticoagulant 12 hours after last apixaban/dabigatran dose and 24 hours after last rivaroxaban dose
NOAC	Different NOAC	Administer new agent when next dose is due

Initiation and maintenance

Initiation of warfarin		
Day	**INR**	**Dosage**
1		5 mg
2 or 3	< 1.5 1.5-1.9 2-2.5 > 2.5	5 mg 2.5 mg 1-2.5 mg 0 mg
4	< 1.5 1.5-1.9 2-2.5 2.5-3 > 3	5-10 mg 2.5-5 mg 0-2.5 mg 0-2.5 mg 0 mg
5	< 1.5 1.5-1.9 2-3 > 3	10 mg 5-7.5 mg 0-5 mg 0 mg
6	< 1.5 1.5-1.9 2-3 > 3	7.5-12.5 mg 5-10 mg 0-7.5 mg 0 mg

Maintenance of warfarin	
INR	**Weekly dose change Dosage**
< 1.1	Consider re-initiation
1.1-2.0	Consider increasing weekly dose by 10-20%
2-3	Maintain same dose
3-3.9	Consider decreasing weekly dose by 10-20%
>4	Consider holding a dose and decreasing weekly dose by 20%

Points to remember in initiation therapy

- Check INR at least 4 times during the first week of therapy
- User lower initial dose (2.5-5 mg) if
  - Age > 75,
  - Weight < 60 kg,
  - Interacting medication known to potentiate warfarin,
  - Hepatic dysfunction,
  - Severe heart failure,
  - Renal dysfunction,
  - Hypoproteinemia,
  - Impaired nutritional intake, and
  - Increase in baseline INR (INR > 1.4)
- Use higher initial dose (5-10mg) if: younger patients, interacting medications known to diminish warfarin effects, enteral nutrition, and a diet rich in Vitamin K.

Points to remember in maintenance therapy

- If patient is on outpatient warfarin therapy, use the home dosage as a guide when continuing warfarin therapy in the hospital
- Monitor INR for medication administration changes in interacting drugs, liver function changes, cardiac function changes, and changes in diet
- Once on therapy for > 1 week, dose modifications between 5 to 20% are recommended. Larger change overcorrect abnormally high or low INR
- Recheck an INR within 4-6 days after adjustment for abnormal INR.

:

هام جدا : Initiation of warfarin :5mg for 3-5 days then repeat INR

و تعدّل على حسب الجدول اللي على اليمين

High Thromboembolism Risk
Perioperative Bridging

Day	Anticoagulation Plan
Pre-op Day 5	Stop warfarin (last dose on Pre-op Day 6).
Pre-op Day 3	Start therapeutic enoxaparin bridging (1 mg/kg SC q12h) or heparin infusion when INR < goal range.
Pre-op Day 1	Check INR, give vitamin K 1.25-2.5 mg orally if INR > 1.5. Last dose of therapeutic enoxaparin (if using) must be > 24 hours prior to surgery.
Day of Surgery	Check INR, consider additional vitamin K if INR > 1.5. Stop heparin infusion (if using) 4-6 hours prior to surgery. Assess hemostasis postoperatively. May resume warfarin evening of surgery if patient taking fluids.
Post-op Day 1	Standard bleeding risk: Resume therapeutic enoxaparin or heparin infusion 24 hours after surgery if hemostasis achieved. High bleeding risk: Consider no bridging or low-dose enoxaparin (40 mg SC daily) 24 hours after surgery if hemostasis achieved.
Post-op Day 2	High bleeding risk: Resume therapeutic enoxaparin or heparin infusion 48-72 hours after surgery if hemostasis achieved.
Post-op Day 4+	Discontinue bridging when INR in goal range.

POST-ARREST PROTOCOL

a)Detection b)prevention by c)proper monitor d) oriented by surgical steps

☞ Ask about 1) cause (4H &4T) 2) duration of arrest(CPR ووقف)(CPR لحد بدايه ال)
3) conscious level after ROSC 4)hemodynamics after ROSC.
5) fulfill targets

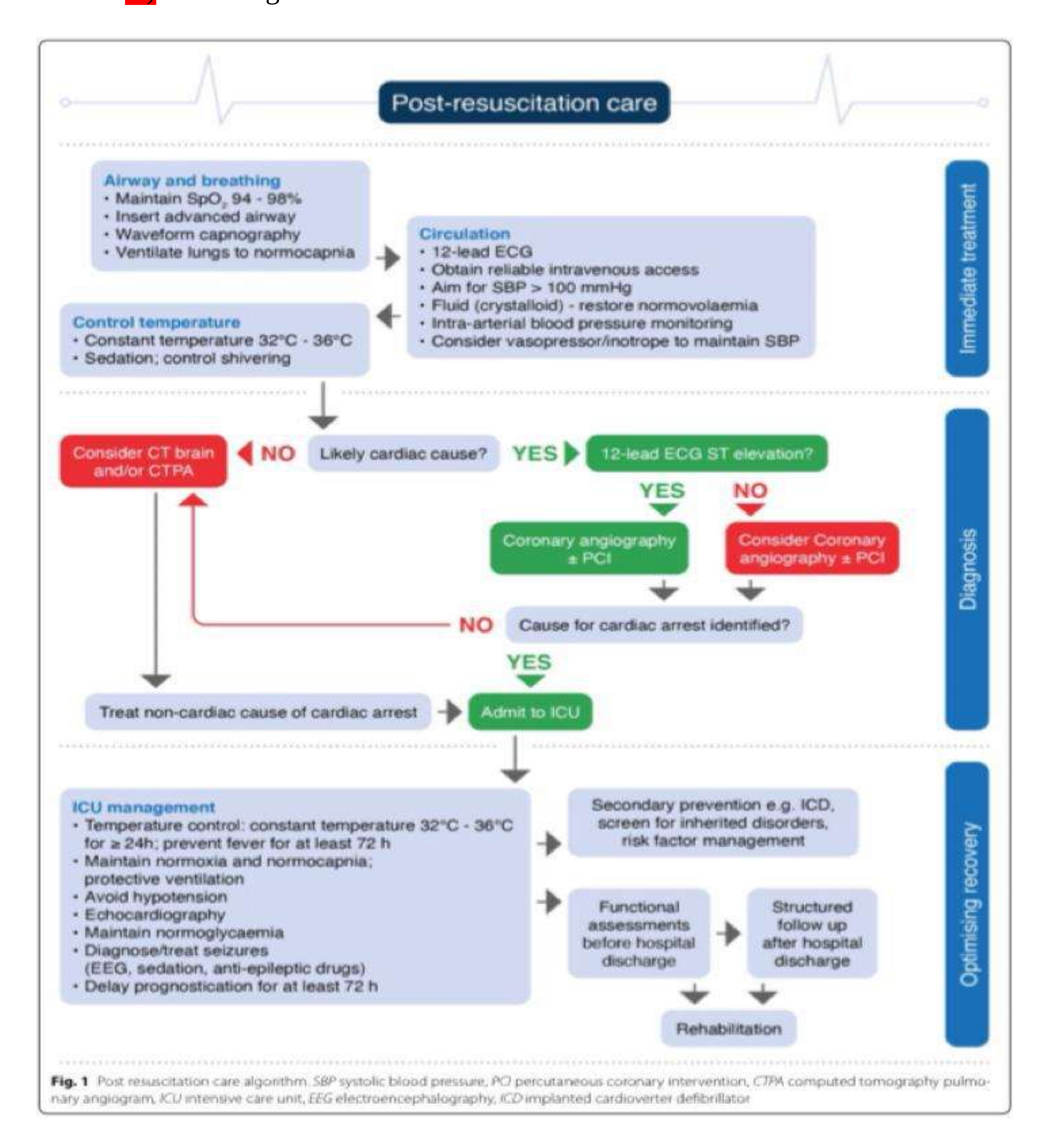


Fig. 1 Post resuscitation care algorithm. SBP systolic blood pressure, PCI percutaneous coronary intervention, CTPA computed tomography pulmonary angiogram, ICU intensive care unit, EEG electroencephalography, ICD implanted cardioverter defibrillator

N.B: ما تنساش الجلوكوز المتعلق في الـ partial TPN

Post-arrest syndrome

1) **(CNS) Brain injury** → Causes late death.

- ♦ Convulsions (lens adams p.199) → myoclonus & tonic clonic
- ♦ Brain stem death
- ♦ Coma ♦ Cognitive dysfunction

■ Avoid muscle relaxation unless EEG is available as it will mask convulsions esp with DCL .

➢ You can give muscle relaxant if the patient is severely hypoxic after ROSC (كفتين ميزان)

2) **(CVS) Myocardial dysfunction** → Causes early death.

Heart: ♦ Hemodynamic instability ♦ Arrhythmia
♦ Myocardial infarction

Vessels : ♦ Vasoplegia due to reperfusion + endothelial damage & ↑ intravascular space.

3) **(hematology) systemic ischemia & Reperfusion response**

- ♦ Impaired coagulation (DIC). ♦ Impairment of immune system (infection).

4) **Picture of the precipitating factor**: 4 H & 4T لازم اعرف ليه

- ♦ Hypovolemia, Hypoxia, Hydrogen ion excess (acidosis), Hypo/Hyperkalemia Hypothermia
- ♦ Tension pneumothorax , Tamponade, Thrombosis (pulmonary or cardiac) & Toxins.

To prevent secondary brain insult → see TBI: p:190.

Management ABCD

1) **airway** → No need for intubation provided that:

- ♦ ROSC after 1 cycle ♦ Return of all intellectual functions
- ♦ SO_2 > 94% even on minimal fio2 ♦ Hemodynamically stable

☝ ***Avoid hyperoxia*** ... *Use the minimal fiO_2 that achieves SO_2 > 94% (free O2 radicals.*

2) breathing

> **Normocapnic patients :**
> Chronic kidney disease, pregnancy, cerebral aneurysm & hepatic patients.

- Once intubated → insert a ryle.
- PEEP: 4-8
- TV: 6-8 ml/kg
- **Avoid hyperventilation** & maintain PCO_2 around 40 mmHg unless brain edema is confirmed by CT. for a better neurological outcome.
- If sedation was started → don't interrupt before 24 hours.
- If tracium is needed for any reason (as ARDS) → EEG is mandatory.

3) circulation

- **Volume**:
  Fluid administration according to static, dynamic & clinical assessment.
- **Content**:
  Avoid hypotonic solutions.
  Avoid glucose containing solutions except in hypoglycemia هتنسي توقف اللى ماشي
  → if mild ,increase glucose intake in ryle, if severe G25%
  Start ryle feeding early to avoid that. Use glucose 25% if you have to.
  Recurrent hypoglycemia is indication of continous infusion of Glucose 25%
- **Pressure & perfusion**:≥65mmHg
  Inotropic support → nor-adrenaline, adrenaline ± dobutamine
  (if $ScVO_2 < 65\%$).
- Serial echo → compare contractility.
- Hemodynamic goals:
  - MAP > 65 mmHg (> 85 mmHg if hypertensive)
    with systolic BP > 100 mmHg.
  - UOP > 0.5 ml/kg/hr. - Mixed venous saturation: 70% -central venous:65%
  - HR: bradycardic side, If UOP & BP (Volume – BP – Perfusion) are maintained with normal lactate → HR down to 40 is accepted.
  - Keep eye on serum K^+ → transient ↑↑ then it ↓↓ due to intracellular shift by the effect of catecholamines
    → may lead to arrhythmia up to arrest.
  - Correct electrolytes before DC & cordarone
  - Maximum cerebral VC: $PCO_2 \leq 20$ mmHg
    Maximum cerebral VD: $PCO_2 \geq 80$ mmHg.

> MAP > 85 in: hypertensive - cerebral aneurysm & high abdominal pressure > 20.

> ☞ *The myocardium starts to recover 2-3 days after ROSC.*
> ☞ *In case of dilated fixed pupil → wait for 24 hours & reassess.*

4) disability as page 155 TBI

BURN

Burn

(13 items) 3×3 +2+2

1) Percentage

Rule of 9

2) Degree

1st (Epithelium),
2nd (Dermis),
3rd (Full skin thickness)

3) Type & site

ABC +type:

1) a)scald, b)flame (inhalational injury even if the face is spared), c)electrical (myocardium &CK), d) chemical burn

2) ± trauma (trauma survey)

Site:

1) Airway (in the first 48 hrs. Intubate if:
A)Presence of croup, b)Cough inadequacy, c)Conscious level (obtunded), d)Use of accessory muscles, E)Deep burn to face or neck, f)Edema in oropharynx)),
2) Lungs (heparin nebulizer for inhalational lung injury in the 1st 48 hrs. In intubated patient or flame burn in face, follow up CT chest)
3) Eye (corneal ulcers- consultation every 48hrs),
4) Ear (cartilage),
5) Genitalia (catheter & physiotherapy)

4) In (Parkland formula)

Old patient:
Volume assessment (static & dynamic) esp. if AKI, Shock & tachycardic
Volume: 4 ml × kg × % of burn (max 50%) ±
Maintenance → 1st half in 8 hrs. 2nd half in the next 16 hrs.
*If hypoxic, anuric, cardiac, airway edema then 3 ml/kg/% of burn & assess Hypoxia and B lines/ 2 hrs.
Rate adjustment: Acc. To UOP & assess vitals/ 1 hr.

5) Out

CK, CKMB, UOP & creatinine follow up for risk of AKI due to rhabdomyolysis

6) GIT

Oral feeding
+ Enteral supplement
+ IV protein (0.5-1 gm/kg) from day 0
+ Glucose from day 5
± Inderal oral start with 0.5-1mg/kg up to 6 mg/kg unless unstable

7) Medically

1- TLC,
2- CRP,
3- Fever,
4- Inotropes,
5- Antibiotics: for 3 days then reassess ,
6- Cultures (D3-4 or with the start of fever)
7- Chronic devices

8) Surgically

wound & its preparation & action (11 items)

9) Chronic devices

10) Pain

Fixed dose (Opioid ± paracetamol & NSAIDs),
+ Late (Gaptin, Tryptizole, Seroquel)
+ Dressing under sedation

11) Physiotherapy

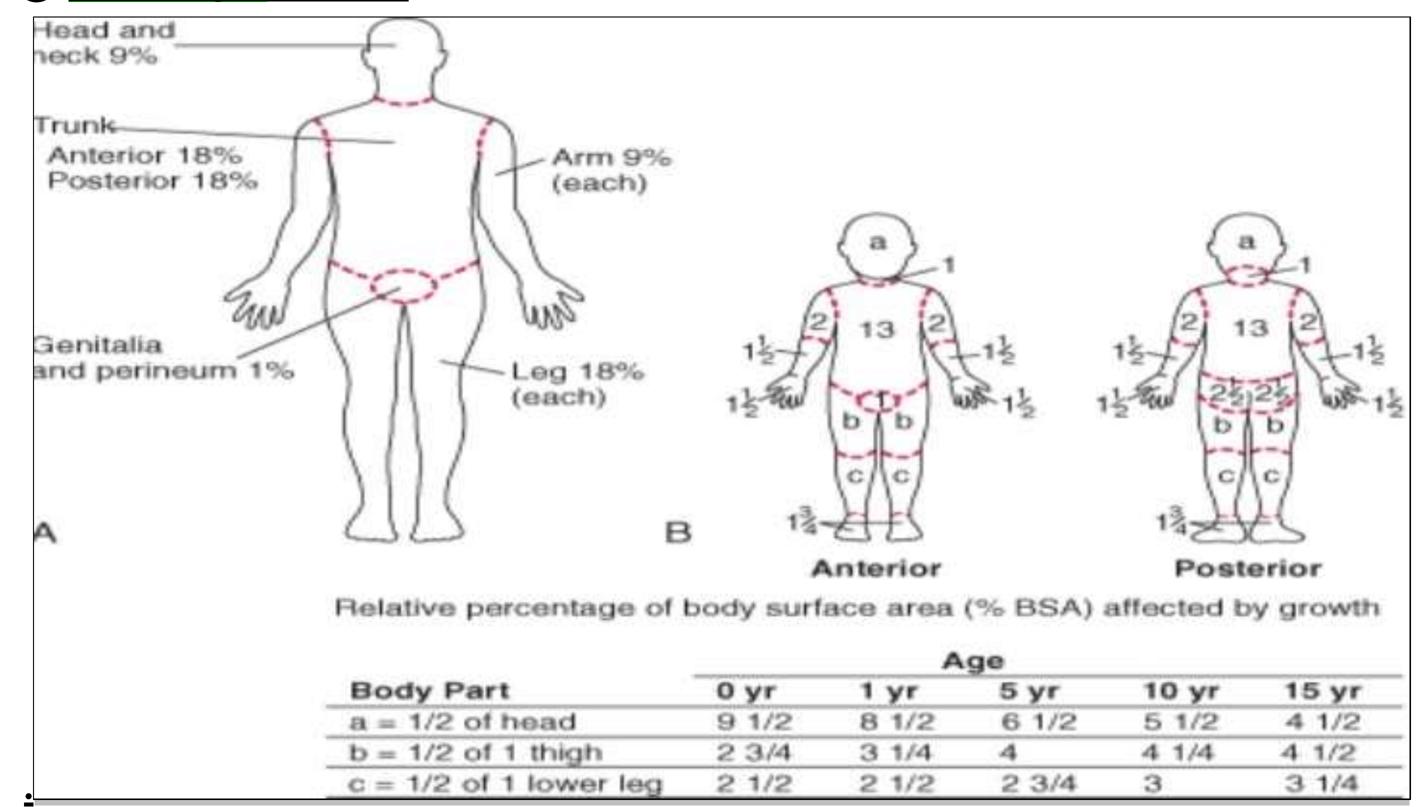
Out of bed is a must if possible

12) Transport

لازم تتأكد و هو بيتنقل ان ضغط كويس و ان معاك بطاطين كتير

13) Monitoring, بداية

❶ **Percentage : rule of 9**



Relative percentage of body surface area (% BSA) affected by growth

Body Part	Age				
	0 yr	1 yr	5 yr	10 yr	15 yr
a = 1/2 of head	9 1/2	8 1/2	6 1/2	5 1/2	4 1/2
b = 1/2 of 1 thigh	2 3/4	3 1/4	4	4 1/4	4 1/2
c = 1/2 of 1 lower leg	2 1/2	2 1/2	2 3/4	3	3 1/4

❷ **Degree:** 1st → Epithelium 2nd → Dermis 3rd → Full skin thickness

وظيفة الجلد يمنع 1-خروج مية و حرارة 2- دخول بكتيريا

❸ **Type & Site:** ● ABC +

Type: 1) a)scald b)flame(inhalational injury even the face spared) (lung)

c)electrical (myocardium &CK) d) chemical burn

2)± trauma(trauma survey)هام جدا

Site (airway – lungs-eye – ear- genitalia)

1- **Airway**: consider intubation (48 hrs ??) according to your assessment:

intubate (6 items) لو شكيت

- presence of croup,
- cough adequacy
- conscious level (obtunded).
- Use of accessory muscles
- Deep burn to face or neck
- edema in oropharynx

→ Give anti-edematous measures.(if only edematous)

- Alpha-chemotrypsin: once or twice daily (IM only)for 2 days

Then Alphintern 1-2 tab /8 hrs (not in ryle) .

If 1- not available or 2-in ryle or 3- pediatrics Maxilase

- Decadrone: 1 amp(8mg) /8 hrs for 3 days in adults.

0.5 -2 mg/kg/day divided over 3 doses in pediatrics.

- Adrenaline nebulizer: 0.5 mg/dose(racemic adrenaline مش عندنا) given over 20 minutes /4 hrs for 48 hrs.

➢ Adrenaline (epinephrine hydrochloride) neb has no role in intubated patients, bronchial asthma or bronchospasm as it acts through VC of upper airway mucosa.

Maximum dose: 5 mg/dose (1 mg over 20 minutes).

Roughly: give 1 mg/dose + 4ml saline /4hr(.in non intubated patient) .

2- Lungs (in flame burn) → liable for CO poisoning & ARDS ,Microthrombi in capillary circulation.

3 شروط for heparin nebulizer :1) inhalational lung injury in

2) 1st 48 hrs in

3) intubated opatient or flame burn in face

→A) Nebulized heparin 5000-10000 unit/ 4 hrs and

B) N-Acetylcysteine nebulizer(vial) sachets عندنا موجودة بتتدوب و تتحط

C) B2-agonist to avoid bronchoconstriction of acetylcysteine

(Alternative sessions of nebulizers) in different times of the day for 7 days

but if the patient is extubated stop it

3- Eye → Watch out for corneal ulcers → Ophthalmology consultationevery 48hrs if lids involved to prevent infection Even if no ulcers give

eye drops (cortisol free) +ointment +fomentation

4-Ear (cartilage)→ENT 5- genitalia (catheter & physiotherapy)

❹داخل **Parkland's formula:**(1-percentage,2- weight,3-volume,4-rate adjustment,5-special cases)

NB: 6-wide bore cannula , 7- وترقم الازايز

a)Percentage : maximum 50 %,
minimal >10 % in <30 kg or 20% in > 30 kg

b)Weight :maintainance or not :> 30 kg →no maintainane ,< 30 kg →maintainance

الهدف من الوزن 1-انك تعرف هتدى parkland ولا لاء 2-ولو هتدى هيبقى فى maintainance ولا لاء لان اعطاءها بيعتمد على الوزن وال percentage

c) volume:

- 4 ml×kg×% of burn max 50% →

The 1st ½ in the first 8 hours & the 2nd ½ in the next 16 hours RL

A) in >30kg andTBSA burn >20%, Ringer lactate(no maintainance)

B) In <30kg and TBSA >10% + maintenance(4ml/kg/hr for 1st 10kg 2ml/kg/hr in 2nd 10kg , 1ml/kg/hr in 3rd 10 kg).

d)Special cases:

- If 1) hypoxic 2) anuric 3) cardiac (poor contractility or severe stenosis 4) severe airway edema

→ 3 ml/kg/% of burn.then assess Hypoxia and B lines every 2 hrs غالبا هتقف بدري

e) Rate adjustment (according to UOP):

A) In >30 kg :assess vital signs every 1hr (Hr<140 ,BP>90/60,so2>90%)

Target UOP (30-50ml/hr)

15-30ml /hr →↑ rate 10% <15ml→↑rate 20%

50-200ml/hr→↓rate 10% >200ml→↓rate20%

Then reassess vital signs as before if:

A) UOP <15ml/hr for 2 or more hrs or pt requires >twice current calculated resuscitation rate for at least 2 hrs(as AKI)

a)check catheter

b)assess breath sunds

c)assess vital signs

d)consider albumin protocol: (1/3 albumin 5%,2/3LR until maintenance rate is reached for 2hrs then switch to LR

if the pt develops oliguric or hemodynamic instability during 24 hrs and parkland completed restart LR acc to dynamic assessment of the patient as . (shock &AKI&tachycardia)

B) In <30 kg :assess vital signs as before

Target UOP (0.5-1ml/kg/hr)

0.25-0.5ml/kg/hr→↑rate 10% <0.25 ml/kg/hr→↑rate20%
1-2ml/kg/hr→↓rate 10% >2ml/kg/hr→↓rate 20%

Then reassess as before (A&B)

لو عيان قديم واخد ال parkland ومالخدهاش لازم تعمل←

Volume assessment (static&dynamic&clinical) esp in AKI&tachycardia& shock

جدا هاااام If shocked :resussitaton first as shock

ولما يبقى non responder ابقى اخصمه من ال parkland

5 خارج CK, CKMB, UOP & creatinine:

- Follow up for risk of AKI due to rhabdmyolysis.(p216.).esp in electrical burn
- If CK > 5000 → proper hydration + diuresis + $NaHCO_3$ as (reperfusion ,crushed limb & neuroleptic malignant syndrome)

6 داخل GIT & feeding:1- inderal و 2-(أكل ± IV)+3-formula

- Start oral feeding as soon as possible.
- with external supplement with:

1) frusibin زجاجة [V. high osmolarity if taken at once →severe diarrhea]

a-ازازه زى الزبادو200مل تتشرب على 4 ساعاتماينفعش فى الرايل مرة واحدة وفى منه b-اكياس دى بديله للرايل

c-powder without odour or taste could be added to food

2) biogainer أكياس فى لبن أو عصير

3)pediasure in pediatric علب زى لبن الأطفال

4)IV proteins (0.5-1 gm/kg)from day 0 & Glucose(5-10 Kcal/kg) from day5

- Central abdominal pressure in circumferential burns, if more than 20 cmH_2O as (packs ,burn,AKI,Ascites) :P(115)

1. Ryle for drainage
2. Prokinetics
3. Release of muscles (if acidotic or oliguric with increased intra-abdominal pressure)
4. suppository up to Rectal tube
5. NPO

- Consider daily 3rd space loss (may require daily static, dynamic assessment of volume status, clinical.)

Non nutritional management of hypermetabolism:

-Propranolol(Inderal oral) start e 0.5-1mg/kg up to 6 mg/kg to keep HR below 20% from baseline unless unstable

❼ **Medical:(TLC&CRP & fever procalcitonin, lactate &inotropes & antibiotics&cultures &chronic devices)**

- Cultures.NOT in day 1,better D3 or D4 or with start of fever
- Antibiotics: for 3 days then reassess.(3rd or 4th generation) if stable.
- IVIG in pediatrics قرار مدرس بس اقترح بأدب → (تَّعرض علي الجروب)

Indication:1- toxic shock syndrome 2-pediatric septic shock 3-immunocompromised 4-steven johnsonأحياناً!! 5-gulian barre after plasma pharesis

keep an eye on: CNS,CVS& respiratory system. (Quick SOFA)

Mechanism of action: neutralization of circulating toxins.

Dose: 100-400 mg /kg/ dose ... Vial → 50 ml containing 2.5 gm, or 5 gm or10 gm الازازه الاكبر ارخص. As colistin

NB : could be given up to 3 doses .

Precautions before administration:

1) hydration with 10 ml/kg saline 2) anti-histaminic
3)steroid in case of previous anaphylaxis to IVIG.

❽ **Surgical (wound & its preparation & action)** 11 item p.

- Early debridement, fasciotomy, grafting or any other intervention after proper preparation :

1)Hb > 10 2) INR<1.4 3)Albumin near normal
4)platelets 50000 or 100000
5)Consent 6) لجنة ثلاثية
7)Device eg tracheostomy 8)swab 9)صور جرحه
10)تبليغ تمريض 11)تحديد صيام 12) تقلب محاليل ، 13) تبليغ لستة جراحة و تخدير
14) حجز دم و بلازما 15) Stop anticoagulation 16)مونيتور وبطاطين
17)line مناسب ومتجرب ومتثبت كويس
18) تشفيط كويس ولو محتاج تغير الانبوبه غيرها 19)الرايل فى عمليات البطن تركب قبل العملية و يدخل بيها

☜ نكلم الجراحة 1- يدخل عمليات بسرعة و2-هيدخل تاني امتى و 3-الـ grafts أخدت ولا لأ(صور) و4-لو فى مشكله الكبير يكلم الكبير .

NB:ای عیان هیغیر بس ومش محتاج حاجه زى scrubbing or excisionممكن يغير فى الرعايه مش لازم ينزل تحت ونعرضه لمخاطر النقل

❾ **Pain & Psychosis:** proper pain control مفيش حاجه اسمها عند اللزوم ومتقولش إنه بيدلع

*Early1-Opioid ± 2-Paracetamol and 3-NSAID (multimodal analgesia) فى مواعيد ثابته حتى لو العيان ماطلبش

*Late 1● Gaptin
2 ● Tryptizole
3 ● Seroquel
} may be late (not in early phase).for neuropathic pain .

☞ Gaptin dose: start with 100 mg/ 8 hrs & increase the dose gradually (to avoid drowsiness) up to 300 mg/ 8 hrs if needed.

☞ Dressing should be done under a) deep sedation with ketofol in fasting patients,
Or b) using morphine with analgesic dose of katalar in non-fasting ones
(0.25-0.5 mg/kg). unless pt started nalufin /6-8 hrs.

❿ **Physiotherapy & Out of Bed:**

هام جدا: حتى لو 1- هو و2-التمريض و 3-انت متضايقين اديله مسكن وحركه من اجلك انت
اللى بيفرق بين عيان بيموت وعيان بيعيش الاراده والحركه والاكل وده وظيفة المرافق
هام جدا لازم تتقال بوضوح بالنص : 50% من عيانين الحروق بيموتوا، احنا علينا الـ Ab و الجراحة و انتي عليكي اكل و حركة
احنا مش جايين نقدم ما يطلبه المستمعون ماتسمعش كلامهم

11)Transportation :

a) تسلمه بنفسك
b) monitor حتى لو صعب على رجله او ارتريال
c)blankets + دفاية
d)±portable ventilator
e)full oxygen cylinder + لاكوز
f)proper tube fixation +intubation box
g)emergency &sedative drugs

Chronic burn :1- systems **as how to present** &2- medical &3- surgical & 4-chronic devices &5- nutrition & 6-pain and 7- out of bed & physiotherapy

Indications of ICU admission

1. Smoke inhalation for fear of airway obstruction.
2. 2nd degree burn involving > 25% of body surface area.
3. 3rd degree burn involving > 10% of body surface area.
4. Development of complications as sepsis, hypothermia & multi-organ failure.

Medical considerations of burn patients

a) Airway considerations:

➢ Recent burn:

- Face mask → painful & difficult..pre oxygenation من بعيد
- Endotracheal tube → difficult insertion & fixation لازم رباط شاش و تخشينه ببلاستر.
- Indications of intubation in burn patients: Hypoxia, stridor,use accessory muscles, deep burn to face or neck ,edema of the oropharynx.
- Follow algorithm of intubation.P72.(6 items)

➢ Old burn involving face or neck: suspect greater difficulty, consider a) awake fiberoptic or b) awake treacheostomy If repeated interventions

b) **Respiratory considerations:**

- Inhalational injury:
  - Upper airway edema → obstruction.
  - Lower airway direct thermal insult → ARDS & microthrombi .

NB:هام جدا Routine High Resolution CT chest in inhalational injury to assess bronchial thickness if >3mm is associated with lung injury and increase risk of pneumonia.

- Carbon mono-oxide poisoning: اسحبه بره مكان الدخان الاول

- Shifts oxy-hemoglobin dissociation cure to 1-the left &2-reduces oxygen-carrying capacity.
- Diagnosed by co-oximeter
  (>20% carboxy-hemoglobin in the blood develop symptoms).

متخفى على 3 مستويات- Normal PO_2, skin color and pulse oximeter reading.(detected by co-oximeter)

- Affinity of CO for Hemoglobin is 210 times that of oxygen.
- CO-Hb level > 20 - 40% are associated with neurological impairment, fatigue, disorientation & shock.

- Half-life of CO is 2 - 4 hours on room air.
- Half-life is one hour with 100% O_2
  1-Non intubated >>non rebreathing 2–intubated (CPAP –high flow).
- Half-life is 15-30 minutes with hyperbaric O_2 فى معهد ناصر take care of convulsions).

☞ **So**: Secure the airway by intubation, 100% oxygen, humidification of gases & suctioning.

- Bronchodilators (B2) are essential in patients with major burn involving the airway alternating with heparin &NAC.

c) **Cardiovascular considerations: as before**

- Intravascular volume depletion:
  - Parkland formula: Lactated Ringer's infusion: 4 ml/kg/ % of involved area in the 1st 24 hrs. The 1st ½ in the first 8 hours & the 2nd ½ in the next 16 hours.
  - Fluid therapy should be monitored by urine output (1 ml/kg/hr), blood pressure, static measures (CVP) or dynamic measures (cardiometry).
  - Crystalloids, albumin or blood transfusion may be indicated.
  - Early excision & grafting is associated with major blood loss.
    لازم يبقى متظبط و الدم محجوز
  - Consider daily 3rd space loss
    (may require daily dynamic assessment of volume status).

💣💣Resuscitation of bleeding & pediatric shock should be done in the golden hour as Dilatation of capillary bed after prolonged hypotension is irreversible

d) Electrolytes & acid base disturbance: follow up & correct.

e) Hypothermia: due to skin loss.(الجلد دخول وخروج (حراره ومايه

- Exaggerated by vasodilatation & infusion of large amounts of IV fluids. So, the patient should be warmed.

f) Pharmacology of anesthetic drugs. **حافظة زي اسمك**

- Sux → allowed in the first 24 hours then contraindicated up to 6 months →↑↑ K.

Contraindications of succinylcholine 7 items	
1.Myopathy.(masseter spasm-malignant hyperthermia –rhabidomyolysis-unpredicted response) 2. CRF with hyperkalemia. 3. History of intraoperative sux apnea (fever or spasm in masseter).	4. History or family history of malignant Hyperthermia or sux apnea or unexplained death. 5.Paraplegia or quadriplegia (spinal cord injury:3 days -9months). 6. Burn: after 24 hours up to 6 months. 7. Suspected difficult intubation.

No. 5 &6 (extra-junctional proliferation of Ach. receptors)

Antibiotc doses in burn & severe septic shock:(suspected MDR)

1-Amikacin→loading dose 30mg/kg , maintainance 15 mg/kg

2-Meronem & tazocin→1st 24hrs 0,4,8,16,24 hrs(خمس جرعات) usually /8 hrs.

then(meronum)1-2 gm /50ml saline extended infusion over 3hrs every 8 hrs ,

(tazocin 4.5gm)

3- **Ciprofloxacin**→400mg every 8hrs or 600 mg every 12 hrs I.V. 400 mg/kg /12 hrs .

4-Tigecycline→loading 200mg and maintenance 100 mg/12 hr

NB :Dual attack is amust in MDR

ANTIBIOTICS

➪**Types of bacteria** :**1**-Gram +ve bacteria,**2**-Gram -ve bacteria,**3**-Anearobes, **4**-Atypical bacteria

Onceذَكرت الـ antibiotics تقول أول مرة ولا ماشي علي مضادات و أنا بعدلها .

Classification of antibacterial agents

Antibiotics that target the cell wall	**Antibiotics that block protein production**	**Antibiotics that target DNA and replication**
➢ β-Lactam Antibiotics ♦ Penicillin 4 ♦ Cephalosporin 5 ♦ Carbapenams 3 ♦ monobactam 1 ➢ Glycopeptides ♦ Vancomycin ♦ targocid ➢ Colistin ➢Fosfmycin **BCG** اختصارهم	➢ Macrolides ➢ Aminoglycosides ➢ Clindamycin (Dalacin) ➢ Tigecycline (Tygacil) ➢ Linezolide (Zyvox) MAC+ غاليين 2 و antistaph	➢ Quinolones ➢ Metronidazole (Flagyl) ➢ Sulphonamides.

Start acc to a)site b)stable or not P() مش ضغط بس c) 48 سرعة السقوط مش هيعيش ل ساعة d)side effects of drugs كفتين ميزان

Modulate acc to p(180)(مزارع او من غير)

Antibiotics that target the cell wall → bactericidal.

➢ **β-Lactam Antibiotics**: better to be given by infusion on 3 hours to maintain serum level

★ **Penicillins**:

a ♦ Naturally occurring penicillins. Active against gram +ve e.g. penicillin G.

b♦ Anti-staphylococcal penicillins with extended spectrum against gram +ve, e.g, Methicillin.

c♦ Amino-penicillin with activity against gram –ve e.g. Ampicillin

d♦ Extended spectrum penicillins: Active against gram -ve & pseudomonas& anaerobes e.g. Piperacillin.

Penicillins with β-Lactamase inhibitors:

- Ampicillin-sulbactam → Unasyn / Unictam (1.5-3 gm /4-6 hrs)
- Amoxicillin-clavulanate → Augmentin (1.2gm /8hrs)
- Piperacillin-tazobactam → Tazocin(4.5gm/6hrs)

unless Crcl <40 →2.25/6hr →stability / تلاجة / نوع المحلول

NB: sulbactams have anti-acinetobacter effect.

★ **Cephalosporins**

♦ First generation → Effective against gram +ve e.g. Cephazolin.

♦ Second generation → Extended activity against some gram –ve e.g. Cefotetan.

♦ Third generation → More effective against gram –ve

Renal adjustment الوحيد اللي ملوش

e.g Rocephin 2gm/24 hrs except in meningitis 2gm/12hrs

cephobid & cefoprazone 1-2 gm /12 hrs

Ceftazidime (Fortum)1-2gm /12hrs احفظهم كويس اوي

♦ Fourth generation → Has good gram +ve and gram –ve

e.g. Cefipime (Maxipime) 1-2gm/12-8hrs don't use in in neuro (TBI) can cause convulsion as tavanic &teinam .

♦ Fifth generation→ Has expanded the activity against gram +ve ,Ecoli,klebsiella & community MRSA e.g Ceftaroline (Zonforo)

♦ sixth generation → cefazoline+ tazobactum مش موجود فى مصر

♦ seventh generation → Zavicefta gram -ve

NB:

- There is cross-sensitivity between penicillins and cephalosporins. Hypersensitivity if detected intraoperatively : ABC + solu + avil + adrenaline(IM,IV,SC) .
- 3rd , 4th generations in divided dose except Rocephen (ceftriaxone) 2gm- 4 gm / 24hr except in meningitis 2 gm /12hr (common) maximum 4 gm All need renal adjustment except Rocephin
- Sulperazone ↑INR (cefoperazone 1gm , sulbactam 0.5gm) 1.5-3 gm/12hr or /8hr

NB In Acintobacter MDR , we need 4gm sulbactam / day =4.5gm sulperazone /8hrs

(follow up INRهام جدا if high switch to unasyn 3gm /6hr no increase in INR)

★ **Carbapenems** كله بيتاخد عضل في البيوت ، في الرعاية وريد

4 مرات 1♦ Imipenem-cilastatin(Tienam)(better to be avoided in a)renal &b) convulsion3% →

/6hr Active against gram +ve, gram –ve, anerobes (500/6hrs).Ext. release 1gm/8hr

dose adjustment : if normal dose starting from 250mg in any ref, douple dose (Medscape or any ref)

3 مرات 2♦ Meopenem (Meronem) more suitable in renal impairment &head trauma less

/8hr incidence of convulsion than teinam →active against gram +ve, gram –ve anerobes (1gm /8hrs)Ext. release 2gm/8hrs

NB: there is interaction between depakin + meronum

مرة واحدة 3 ♦ Ertapenem (Invanz) → does not cover pseudomonas →
/24 hrs Not used in chest infection(1gm/24hr)

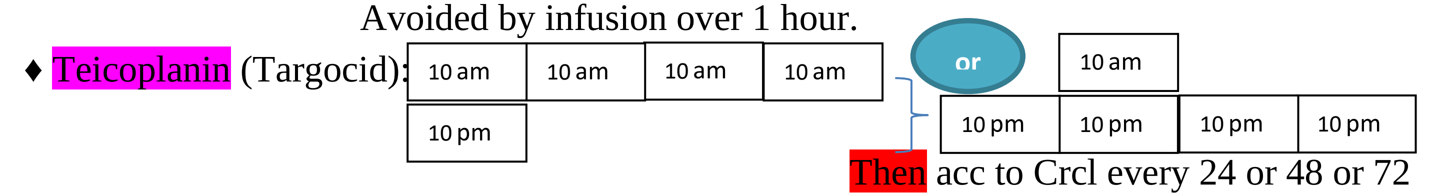
★**Monobactam:** Aztreonam, gram –ve only, not used.

➢ **Glycopeptides:** - Spectrum: Gram +ve & staph.

♦ Vancomycin:

- The most effective anti-staph drug.
- Dose: Loading 25-30 mg/kg (no adjustment) → in critically ill cases. هام جدا جدا
  Maintenance 15 mg/kg/dose every 12 hrs (1 -1.5 gm /12hrs) has renal adjustment
  Inhalational :250/12hr or 500/ 12 hr
- Adverse effects:a) nephrotoxic esp in combination e tazocin +
  b)Red man syndrome.
- Red man syndrome if infused at a rate > 50 mg/min (as epanutine)
  (histamine release → VD → redness of upper half of the body → Treatment: hydration + anti-inflammatory).
  Avoided by infusion over 1 hour.

♦ Teicoplanin (Targocid):



Then acc to Crcl every 24 or 48 or 72

- Dose: Loading 400 mg/12 hrs 1st day then 3 doses / 24 hrs no renal adjustment.
  then 400 mg/day up 6mg /kg /day.
  In renal impairment → after day 4(5 doses) وتعلمهم فى ورق العلاج ,
  adjust the maintanance according to creatinine clearance
  If Cr.Cl. 40-60 (400 mg /48 hrs) or less than 40 (400 mg /72 hrs).
-Side effects : a) thrombocytopenia (common) b) less nephrotoxic

➢ **Colistin** : cornerstone of extreme gram –ve
- Belongs to polymyxin group of antibiotics.
- Spectrum: Gram –ve only
- not cover proteus , anaerobes

(the most effective antibiotic against gram -ve bacteria &MDR{3 or more} grame –ve هام جدا).

- Better to be used with another agent:
  a) sulperazone/unasyn in acinetobacter 3gm/6hrs or 4.5/8hr(follow up INR)
  or b)carbapenems or c) tygacil
  or d) maxipime.
  combined with 2 other agents against gram -ve * لو مش مستجيب ممكن تلاتة مع بعض

A)TIGACYL + B)TEINAM OR MERONUM UP TO EXTENDED RELEASE +على 50مل على مدار 3 ساعات C)COLISTIN

- Can be given by inhalation+IV(2million /12hrs) in cystic fibrosis or lung abscess +IV.
- Severely Nephrotoxic → adjusted in renal impairment.

- Dose: Adults: Loading: 9 million units …No renal adjustment.
  Maintenance: 4.5 million units/12 hrs

.***Dose adjustment of colistin :***

NB: colistin dose in dialysis : 2.5 million / 12 hr + I million after dialysis (زياده)

Creatinine clearance, mL/ minute[b]	Daily dose of CMS for plasma colistin $C_{ss,avg}$ of 2 mg/L[c]	
	mg CBA/ day	Million IU/ day
0	130	3.95
5 to < 10	145	4.40
10 to < 20	160	4.85
20 to < 30	175	5.30
30 to < 40	195	5.90
40 to < 50	220	6.65
50 to < 60	245	7.40
60 to < 70	275	8.35
70 to < 80	300	9.00
80 to < 90	340	10.3
≥ 90	360	10.9

Pediatrics: 2.5 - 5 mg/kg/day of colistin base divided into2- 3 doses

(no loading dose) .(5mg) دايما بنحسب علي الجرعة العالية

Eg: child 15 kg :15×5=75mg = 1million /12hrs (2 millions / day)

- 1 million unit cloistin = 34 mg colistin base = 80 mg colistin sodium.

☞ ***Calculate the dose according to colistin base not sodium.***

1 مليون اغلى(200جنيه) من ال 2 مليون(300جنيه) زى ال IVIG

➢***Fosfmycin***(Monuril) is the primarily antibiotic used in ttt of UTI
dose 3gm(sacch.) once in UTI or 3gm once every 2-3days for 3 doses in MDR UTI.

Antibiotics that block protein production

➢ **Macrolides:**

دوا بيوت - Erythromycin(500/6hr), Clarithromycin(500/12hr), Azithromycin(500 laoding then 250 /24hr)+

- Spectrum: Gram +ve & atypical bacteria → used in community acquired pneumonia

- Adverse effects: prolonged QT interval.& exaggerates toxicity of xarelto → switch to Eliquis (superior e Xarelto)مهمة جداا

- **Aminoglycosides**: dependant on peak level "so single dose" except pediatrics
  - Spectrum: Gram -ve & staph.
  - Nephrotoxic & ototoxic.
  - Can be given by inhalation +IV…Never inhalation alone.
  - gentamycin 3-6mg/kg/day (amp 80 mg)
  - Amikin 1-1.5gm /24hrs (vial 100-500mg),Inhalation : 400mg / 8 hrs
    (15mg/kg/day ,divided dose in pediatrics)
- **Clindamycin (Dalacin): 3C**
  - Spectrum: Gram +ve & anaerobes& bacterial toxins →
    Used in soft tissue infections.
    Cover community acquired MRSA not in hospital acquired MRSA
  - Disadvantage: poor CNS penetration & not suitable for child C patients.
  - Adverse effects: Pseudo-membranous colitis →
    diagnosed by stool analysis showing clostridium difficile toxins
    treated by oral flagyl or oral vancomycin.
  - **Dose :600/8hrs**
- **Linezolid (Zyvox)(IV-oral):** not with dalacin **(most safe in renal)targocid والـ vanco اخو**
  - Spectrum: Gram +ve & staph + anti-bacterial toxins activity.
    Not recommended for ttt of CLBSI only vancmycin or targocid.
  - Advantages: high bioavailability (easy to switch to oral therapy) &
    used safely in renal failure.(no renal adjustment..as rocephin)
    good penetration to lung & soft tissue more than vanco بسماينفعش يمشى فترات طويله
  - Disadvantages:1) photosensitive (special cover) +تغطى جهاز الورد
    2) large volume (600 ml/day), not preferred if anuric only
    3) expensive.
  - Adverse effects:
    1)lactic acidosis
    2) thrombocytopenia esp in renal patient
    (rapid and more aggressive)(after 10-14 days)
    3) not used with MAO inhibitors& SSRI ادويه نفسيه
    4) Cordarone.
  - Dose :600 mg/12hr, 300ml voume محلول

- **Tigecycline (Tygacil) :**

- Spectrum: Gram +ve, anaerobes & some atypical & gram -ve except Pseudomonas(as invanz) & proteus.(2P)
- Better to be used with another agent:
  - a) sulperazone/unasyn or
  - b) carbapenems
  - c)colistin

single agent in 1) stable soft tissue or 2) abdominal infection , otherwise use it with another agent &double the dose .

- Dose: a) Adult: Loading 100 mg once ... Maintenance: 50 mg /12 hrs.

In chest infection & septicemia ,UTI: 200 mg once then 100 mg /12 hrs +other agent.

لو اضطريت لاستخدامه double the dose علشان حتي لو حصله deposition كمية كافية توصل للدم

b) Pediatric dose: Loading 1.5 - 3 mg/kg once

Maintenance: 1-2 mg/kg/dose every 12 hrs (maximum: 50 mg/dose).

- Disadvantages:
  1- does not maintain adequate blood level (not used alone in septicemia)
  2- weak in chest infections
  (inactive against pseudomonas + poor chest penetration)
  3-poor penetration of BBB
  4-low level in urine (UTI).
  5- adjusted in child C classification P227 (as Dalacin)
- Advantages: used a) safely without adjustment in renal failure.
  b) Concentrated in soft tissues & abdomen → effective in in soft tissue & abdominal infections

Side effects :↑↑liver enz (adjust in child C)

Antibiotics that target DNA and replication → bactericidal.

- **Quinolones** : has renal adjustment

دوا مستشفيات a- Ciprofloxacin (Cipro)400/8-12hrs IV or 500/12hrs PO

b- Levofloxacin (Tavanic).500-750/24hrs oral or IV

c- moxifloxacin : 400/24hr ,cover anaerobes not cover pseudomonas

- Spectrum: Gram -ve, atypical & some gram +ve.

- Adverse effects:

Pediatrics: Immature closure of epiphysis → contraindicated in children below 18 years but can be used for 1 week.

Geriatrics:1- DCL&convulsion. مهم جدا 2-Prolonged QT interval(as macrolides &Norvasc) & predispose to ventricular arrhythmias. 3-rupture of aortic aneurysm 4-hypoglycemic episodes

- **Metronidazole (Flagyl):** Pediatric dose: 1.5 ml/kg
- **Sulfonamides**

شوية تجميعات لازم تبقى فى دماغك : 10تجميعات

1)Nephrotoxic drugs :

A) Aminoglycosides (amikin & gentamcin)
B) **Vancomycin esp with tazocin**
C) Colistin

2)Amikin + colistin :

- Gram negative
- Nephrotoxic
- Can be given both inhalational + IV

3)Inhalational antibiotics : ***مفيش inhalation يمشي لوحد لازم معاه IV***

- Amikin 400×3
- Vancomycinn 250-500 ×2
- Colistin 2 million ×2
- Fortum RARE 1gm/3hr

4)Atypical bacteria: sensitive to-1 quinolones,-2 macrolides &-3 tygacil.

5)Infections in ICU: = SITE

1- Pneumonia: Hospital-acquired & community-acquired.
2- Peritonitis: Primary &secondary.
3-Soft tissue infections: as a) necrotizing fasciitis b) forneir gangrene c) extended infection from diabetic foot to leg or thigh d) ludwig's angina..
4-Diabetic foot. (limited to foot)
5-Infective endocarditis.
6-FB in the eye.
7-meningitis
8-compound depressed
9-Animal bite
10-Mucormycosis

6)**Antibiotcs taken in the form of extended release**

1)Tazocin 2)Meronam 3)Sulbactam 4)ceftazidime/avibactam 5)ceftolozane/tazobactam

7)Suspected MRSA infection in the following conditions:

- **Incidence of MRSA > 10% in peritonitis & pneumonia**
- **(Tygacil & aminoglycosides)<< 2 مش بيكتبو عشان ال MRSA**

1-CVL infection
2-Infective endocarditis
3-Meningitis
4-Infected burn (late)
5-Soft tissue infection

Add 1- vanco or 2-targocid or 3- zyvox

8)Anaerobes sensitive to:

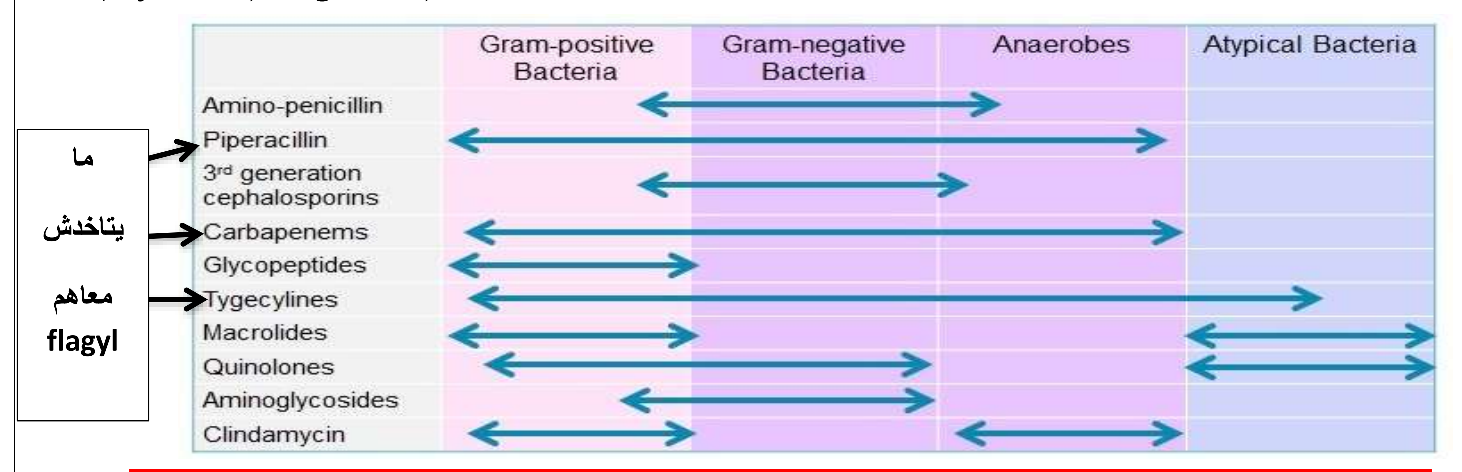
1)Flagyl 2) Dalacin 3) Moxifloxacin 4) Carbapenams 5)Tazocin 6)Tygacil.

9) Liver affection:

1) Tygacil 2)Dalacin 3)Azoles 4)V-fend

10)Thrombocytopenia

1)Zyvox 2)Targocid 3)Tazocin



هام جدا NB:Septic shock+ AKI → B lactam with normal dose for 48hrs then readjust

كيفية التصرف فى عيان على 4 or 5Antibiotics

1-Surgical & chronic device
2-Special organisms (viral ,fungal ,TB)
3-Extended release e.g meronam
4-Inhalational e.g colistin , amikacin
5-Echinocandins instead of Diflucan (Ecalta not in peditrics)
6-IV Ig
7-Special types a)Candida (blood or urine)
b)Acinetobacter MDR (dual attack)
c)Klebsiella (invanz &carbapenem

In any infection mentioned before, patients are classified into: **تقسيمه لتسهيل الفهم**

☞ **Stable patient:**عيان كويس وماسك نفسه و مفهوش شرط من الأربعة → start with 3rd or 4th generation cephalosporin or tazocin.

☞ **Unstable patient:** عيان متكحول ملوش غير فرصة واحدة

a.)hemodynamically unstable (start with carbapenam)

b). on steroid Therapy
.c) immunosuppressed
d) prolonged hospital stay>48hrs with uncontrolled infection

} start with tazocin or carbapenam

في الحالات دي بنبدأ بواحد من العائلات الكبيرة اللي هي

Tienam& Meronem{10 sites} (Invanz {9sites}except in chest), ± another agent according to a) site of infection b)stable or not c) سرعة السقوط d) side effects of drugs كفتين ميزان

NB (hopeless :terminal or surgically unresolved & reversableخف ايدك إلا لو العيان)

NB: tazocin may used for 48hrs in pts on minimal dose inotropes

NBDalacin & zonfor used in ttt of acquired MRSA.

Bacteria are categorized into:

☞ Gram +ve

☞ Extreme gram +ve (MRSA & VRSA) → sensitive to1) vancomycin,2) targocid,3) zyvox (Occasionally tygacil & amakacin but not used as antistaph). **ميتكتبوش مع بعض anti staph**

☞ Gram -ve

☞ Extreme gram -ve (MDR forms of klebsiella, Pseudomonas, Acinetobacter, E.coli, enterobacter)

→ covered by1- colistin,2- tygacil & 3-occasionally carbapenems & tazocin.

a) Add extreme gram –ve as Colistin.except in renal

b)In soft tissue or abdominal infections+kidney affection → add tygacil if no rapid deterioration ,if rapid= colistin

if Not available → Tygacil.

(not in severe septicemia& chest infections → double dose لو اجبرت)

Dual attack is amust in MDR (carbapenam + colistin) , if not responding triple attack (carbapenem +colistin + tigacyl)

☞ Anaerobes.

♦1- Carbapenems &2- tazocin are active against gram +ve, gram -ve & anaerobes,Not e flagyl

♦ Invanz is inactive against pseudomonas & that is why it is not used in chest infection.

♦ Tienam & Meronem are slightly superior to Tazocin. If the patient is heamodynacally unstable (proved with studies) better outcome

☞Acquired MRSA 1- dalacin 2-

Others: TB, fungi & viruses.

Start the Antibiotics according to :

1)site 2) stable or not 3) سرعة السقوط مش هيستحمل 48 ساعة 4)±side effects of drugs كفتين ميزان

1. Chest infection(hospital & community)

➢ **Diagnosis of pneumonia**

1. Radiological finding.

± 2. Fever / productive cough / hypoxia / aspiration / culture.

NB: fever, productive cough and radiological finding -ve called tracheobronchitis common in ICU , و بيقلب pneumonia

1. Hospital acquired pneumonia and ventilator-acquired pneumonia >48hrs in hospital

➢ Organism: usually gram negative.

- Use **dual** anti-pseudomonal drugs:

A)- Stable: Maxipime or tazocin - Unstable: Tienam / Meronem(superior في الكلاوي)

B) + Aminoglycoside (Amikan {Neb. & IV} or Gentamycin) or Quinolone (Cipro or Tavanic)→ almost excluded acc.to the last antibiogram[no. of organisms , sensitivity].

or colistin in cystic fibrosis (IV& Neb.) or tygacil (douple dose)

- If the incidence of MRSA > 10% → add anti-staph: Vanco / Targocid / Zyvox (not tygacil , poor penetration).

2. Community-acquired pneumonia

➢ Organism: Strept. pneumonia, H. influenza & Atypical organisms.

➢ No risk of pseudomonas: Augmentin / Rocephin / Maxipime ± Klacid or tavanic or Zithromax severe cases or without klacid ± 3^{rd} or 4^{th}

➢ Risk of pseudomonas or hemodynamic instability: as hospital acquired pneumonia (without anti-staph).

Risk of pseudomonas
- Alcoholism
- Chronic bronchiasis
- Mechanical ventilation
- Febrile neutropenia
- Septic shock with organ failure

N.B In chest infections, focus on anti-pseudomonal & don't rush to anti-gram +ve MRSA <10%

*Amikcin may cover 20% of extreme MDR -ve

If suspected viral infection if feverish and acute bilateral lung infilterats →Tamiflu 5-7 days.(consider covid)

NB: Aspiration pneumonia : as above ±bronchoscope

2. Abdominal infection(1ry & 2ry)

Primary peritonitis: عيان بطنه اتفتحت مرة واحدة

➢ Stable: 3^{rd} or 4^{th} generation cephalosporin + Flagyl (لو العملية فيها intestine مفتوحة) or tazocin لوحده.

➢ Unstable: Invanz/ Tienam/ Meronem.

Secondary Peritonitis: عيان بطنه اتفتحت أكثر من مرة →

as 1ry unstable ± antifungal ± antistaph.

In toxic megacolon : Tigacyl ± oral vanco and iv flagyl

3. Soft tissue infection (complicated burn) &necrotizing fascities & fornier gangrene& diabetic foot extending to leg or thigh هام جدا

- Stable:
  1) 3rd or 4th generation or tazocin
  +2) Anti-staph (vanco or targocid)
  +3) Dalacin due to bacterial toxin (except zyvox donot add dalacin with)
  Or(tigacyl single agent 3+2+1 بديل ل)
- Heamodynically Unstable:
  1) Invanz/ Tienam/ Meronem
  +**2)**Anti-staph(zyvox or vanco or targocid)
  +3)Dalacin except with zyvox

4. Diabetic Foot

- Stable: 1)3rd or 4th generation cephalosporin or tazocin +2) Dalacin
- Heamodynimcally Unstable: start with1) Invanz/ Tienam/ Meronem/ Tazocin 2) Dalacin.

5. Meningitis

Hospital aquired (nosocomial) meningitis	Community aquired meningitis
Vancomycin + Meronem/fortum / maxipime + Rimactane (optional) Vancomycin: Ld: 20-25 mg/kg(max 3g /dose) MD: 15-20 mg/kg/dose q 8-12 h IV + 5-20 mg q 24 h intravent/ thec. Meronem / fortum/maxipime : 2g q 8h Rimactane: 600 mg q 24 h	1-50 yrs.-----> Ceftriaxone + Vancomycin > 50 yrs or DM or immune compromised Ceftriaxone + vancomycin + unasyn Vancomycin: same as before Ps : Continuous infusion of 60 mg /kg /day afte LD may replace intra vent/thec. inj in case of inflamed meninges Ceftriaxone : 2g q12 h. Unasyn :3g q 6 h

TB Meningitis 1-MRI suspect 2-CSF may be free 3-all cultures free 4-anti tuberculousدكتور يدي

6.Animal bite **مهمة جدا**

a)Rabies vaccine 0,3,7,14,28 days and b) tetanous toxoid c) if not vaccinated e tetanous vaccine , 3 doses give tetanous ivig
d)No depridment or sutures in the period of rabies vaccine unless emergency

7. Infective Endocarditis :supec in case of bil. Lung abscess & fever of unknown origin.

1-Gentamycin + 2-Vancomycin +3- 3rd generation cephalosporin or Invanz/ Tienam/Meronem/ Tazocin

4-Give full anti-coagulation if there is no risk of bleeding or candidate for surgery →after consult :1) قلب و2) قلب وصدر

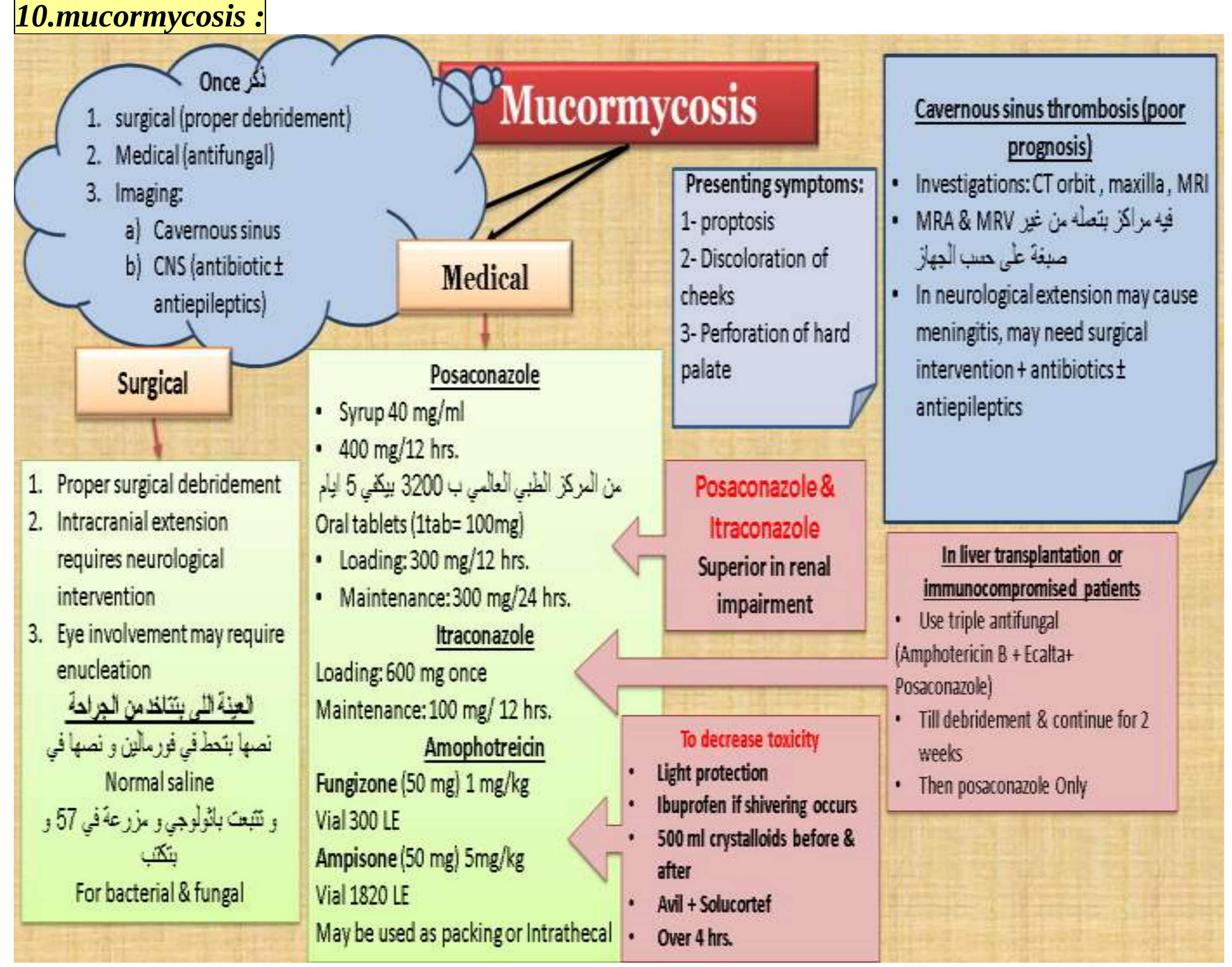
8. Intraocular infection or foreign body

Vancomycin.

9. Compound depressed skull fracture جلد مفتوح

Vancomycin + 3rd generation e.g fortum.

10.mucormycosis :



Indicators of improvement or deterioration (24-48 hrs)

1. Fever 2. Lactate 3. TLC (may be increased e blood transfusion)
4. Dose of vasopressor if septic by DD of shock
5. CRP لازم يتعمل لاى عيان sepsis عند الدخول وكل 3 ايام

لازم تسأل نفسك فين ال source of sepsis وعلى اساسها نحدد ال antibiotic وتسحب

CRP a)baseline 24hrs after admission in case of burn and sepsis

b) before changing of antibiotics and 2 days later بحد اقصى مرتين فى الاسبوع عشان اهدار المواد

لتعديل المضادات الحيويه (بمزارع او بدون مزارع)

☜ لو العيان لسه مطلعلوش مزارع ومش بيتحسن ننزل بسهمين

لازم تتعدل a) Medical(fever ,lactate,TLC, CRP,dose of vasopressor ,cultures) &±b)Surgical ±c)chronic devices (chest tube ,CVL,tracheostomy , drains)

لازم تتعدل a)Medical

➢ لما تيجي تنقل من كل step للي بعدها لازم تراجع سهم الـ **surgical source +chronic devices** وتتأكد إنه controlled الأول بين كل نقلة و التانية 48 ساعة إلا لو بيسقط سقوط حر

لو مش controlled بنتخانق مع الجراح وبرده ننقل للخطوة اللي بعدها (extend the spectrum) .

➢ لو العيان بيقع بسرعة خش برجالتك كلهم لكشة واحدة لأنه مش هيستحمل 48 ساعة .

➢ لو انت بادئ بالجروب الاول انقل علي جروب التينام واخواته .

➢ لو انت بادئ بجروب التينام هتزود الآتي:

Add anti-extreme gram positive (MRSA) especially in case of 1) burn,2) soft tissue or 3)abdominal infection as a) Vancomycin, b)Targocid,c) Zyvox .(depend on kidney & finance)

or extreme gram negative acc to site and expectation

➢ لو مفيش تحسن بعد 48 ساعة **surgical source+chronic devices** لازم تعملهم تاني يمكن في تغيير

Add antifungal:

Diflucan موجود فى القصر (in stable patients or can't afford) or UTI with candida albican >100000 &symptomatic

or V-fend (voriconazole) if unstable patients or if diflucan is endemic or asperigillus.

or Amphtericin B: the gold standard of anti-fungal drugs:

Conventional form → Fungizone (nephrotoxic, hepatotoxic, ↓K) → cheap 300 LE.

& Liposomal form → Ampisome (no adverse effects) → expensive 1820 LE !!

or Echinocandins موجود فى القصر→a) Mycamine (Micafungin) b)Ecalta (Anidulafungin) c) Cancidas غالى جدا

موجود في الرعاية مجانا (Caspofungin)

لو مفيش تحشن بعد 48 ساعة surgical source + devicesوزود Anti-extreme gram negative

ال عادةً بنبدأ Anti-MRSA & anti fungal مع بعض

➪Add extreme gram –ve as Colistin.except in renal

➪In soft tissue or abdominal infections+kidney affection → add tygacil if no rapid deterioration ,if rapid= colistin, → Tygacil.

(not in severe septicemia& chest infections → double dose لو اجبرا)

➢ لو متحسنش بعد 48 ساعة ← **surgical source+chronic devices**

Consider viral infection (in pneumonia cases), **TB or infective endocarditis esp cvp .**

±extended release ±nebulizer ±specific ±Echinocandins

لو العيان اتحسن بعد اخر مضاد حيوى اتحط يكمل عليه من 10-14 يوم ماينفعش يتشال قبل كده

لو العيان بيسقط سقوط حر مش هيستحمل 48ساعة حط كله مع بعضه

±b)Surgical → كلم الكبير يكلم الكبير أو staff تخدير اللستة

surgical source of sepsis:

- Chest: abscess, empyema & pneumonia with complete obstruction (for bronchoscopy).
- Abdomen: surgical wound, leakage (collection) & stoma(retracted or gangrenous).

♦ Soft tissue: diabetic foot, burn, pockets of pus & vacuum.

طول ما الـ surgical source متحلش يبقى كل العلاج بلا طائل .

±c)Chronic devices (chest tube ,CVL,tracheostomy,drains):

☜ **لو العيان طلعله مزرعة(medical , ±surgical ,±chronic device)**

1. لو العيان بيتحسن والمزرعة طلعت resistant للمضاد الحيوي اللي ماشي عليه و sensitive لمضاد حيوي تاني يبقي ننفض للمزرعة (صدق العليل) .
2. لو العيان مش بيتحسن والمزرعة طلعت مضادات حيوية غير اللي أنا كاتبها يبقي تمشي مع المزرعة وبرده تتأكد من سهم الـ surgical & chronic devices .
3. لو العيان بيتحسن علي المضادات اللي انا كاتبها والمزرعة طلعت sensitive لواحد منهم تحديداً يبقي نكمل علي اللي طلع في المزرعة و نوقف ا لباقي (de-escalation) .
4. لو العيان مش بيتحسن والمزرعة طلعت sensitive لنفس المضادات اللي ماشي عليها يبقي ننفضلها ونرجع للـ algorithm +. surgical source+ chronic devices

Special types of organisms هام جدا :

a)pseudomonas (if unstable dual attack p(183))) if stable :may take single drug

b)Acinetobacter(dual attack p(183)Meronam +colistin /salbactam/tygacil (3gm unasyn /6hr , 4.5 gm /8hr

c)klebsiella MDR if not responding to colistin or not available →teinam +invanz

d)candida in blood p (187)

e) candida Albicans in urine (difflucan, Amphotericin B) original form not the expensive one: 1)> 100000 2)symptomatic 3)albican 4)change urinary catheter

f) Viral , TB

☞ **MALDI TOF:**

مزرعه بتتعمل نتيجتها خلال 24 ساعه موجوده فى 57357 والسعودى الالمانى ووادى النيل

Biofire

(pneumonia panel for bacreial & viral& fungal – respiratory panel for viral)

(blood & urine biofire are available)

بتطلع فى ساعه ب 4000 جنيه بس علشان تعرف ال sensitivityلازم تطلبها هنطلع فى خلال 24 ساعه

Detects genotype of organism (200LE) sensitivity (3-4 hrs)

Culture of anaerobs →within one hour in 75375

☞ **Terminal cancer:**

- No cure for the cause of ICU admission, e.g, DCL due to brain metastasis→No CPR..
- While as metastatic cancer patients admitted for a curable complication should be treated effectively, e.g, pneumonia in a patient with cancer breast causing respiratory distress & hypoxia.

☞ **DNR decision (do not resuscitate):**

قرار بياخده الكبير ولو انت الكبير وشكيت للحظة يبقى العيان ده for CPR

☞ Don't give 2 antibiotics of the same group, e.g, unasyn + claforan (2 beta lactam antibiotics) or two antistaph drugs . except in:

1) klebsiella MDR not responding to colistin or colistin not available (invanz +tinam or meronam)&

2) meningitis (rocephin + unasyn)

3) عيان المخ والقلب وأي عيان خلصان في البرايفت أو رعاية ملهاش صاحب

☞Zavicefta (ceftazidime& avibactem) is indicated for the treatment of subtypes of gram negative organism as klebsilla بس غالى6800 daily (2.5gm /8hrs infusion over 2 hrs) , colistin is still superior (for all extreme –ve) but nephrotoxic.

☞ Immunocompromised patients on maximum inotropic support due to septic shock can be given 10-25 gm of IVIG in toxic shock syndrome in adult قرار الاستاذ فقط.

☞ Antibiotics act by either: ♦ Peak serum level: given once daily as aminoglycosides.
♦ Steady serum level: multiple doses or infusion is better .

☞ Extreme gram +ve: MRSA

☞ Extreme gram -ve: MDR → Pseudomonas, Klebsiella, Acinetobacter, E.coli & Enterobacter. Maximize dose of antibiotics and better give it by infusion e.g meronam 2gm/8hrs ,tygacil

Psudomonus → -In hemodinamically unstable dual antipsuedomonal at least for 1 week maximum dose. If in stable patient , one is enough.

☞ All 3rd generation cephalosprins are give in divided dsoes except Rociphen which is given once daily (except in meningitis 2 gm /8hr) & has no renal adjustment.

للبيوت☞ In case of IM administration → take care that the solvent is not lidocaine → in pediatrics may lead to convulsions & arrest. (Max. dose 7-8 mg) esp. in low weight

Zinforo : for MRSA plus E Coli and klebsiella and H-influenza (vial 788 LE) 600mg/12hr

اى عيان بيغسل كلى وزع المضاد الحيوى بالليل بحيث تضمن انه هياخده بعد الغسله ولو اخده الصبح لازم تحط فى بالك انه هياخد جرعه تانيه بعد الغسله

Amikan 1.5 gm IV /24 hrs +neb400/8hr , In chest infection(rare to be used): consider * . Fortum 1 gm neb/3hrs

TB investigation: Gene expert (urine , blood or sputum) instead of 3 consecutive acid fast bacilli sputum.

Every antibiotic has :

1-Volume & concentration of dilution
2- Type of solution for dilution
3- duration
4-Stability برة وجوه التلاجة → Every antibiotic has stability esp in pediatrics & renal patients.

1-حطه بنفسك في التلاجة   2-واتأكد انه طالع من التلاجة قبل كل جرعة

3-و مكتوب عليه اسم العيان
4- وفاضل فيه اد ايه لانه بعد مايتحلل لا يتم اعطاؤه مره واحده . (لازم فى نص اليوم تبص على التلاجه)

NB☞Maxipime & Quinolones can cause convulsions (so as tienam especially in renal patients).

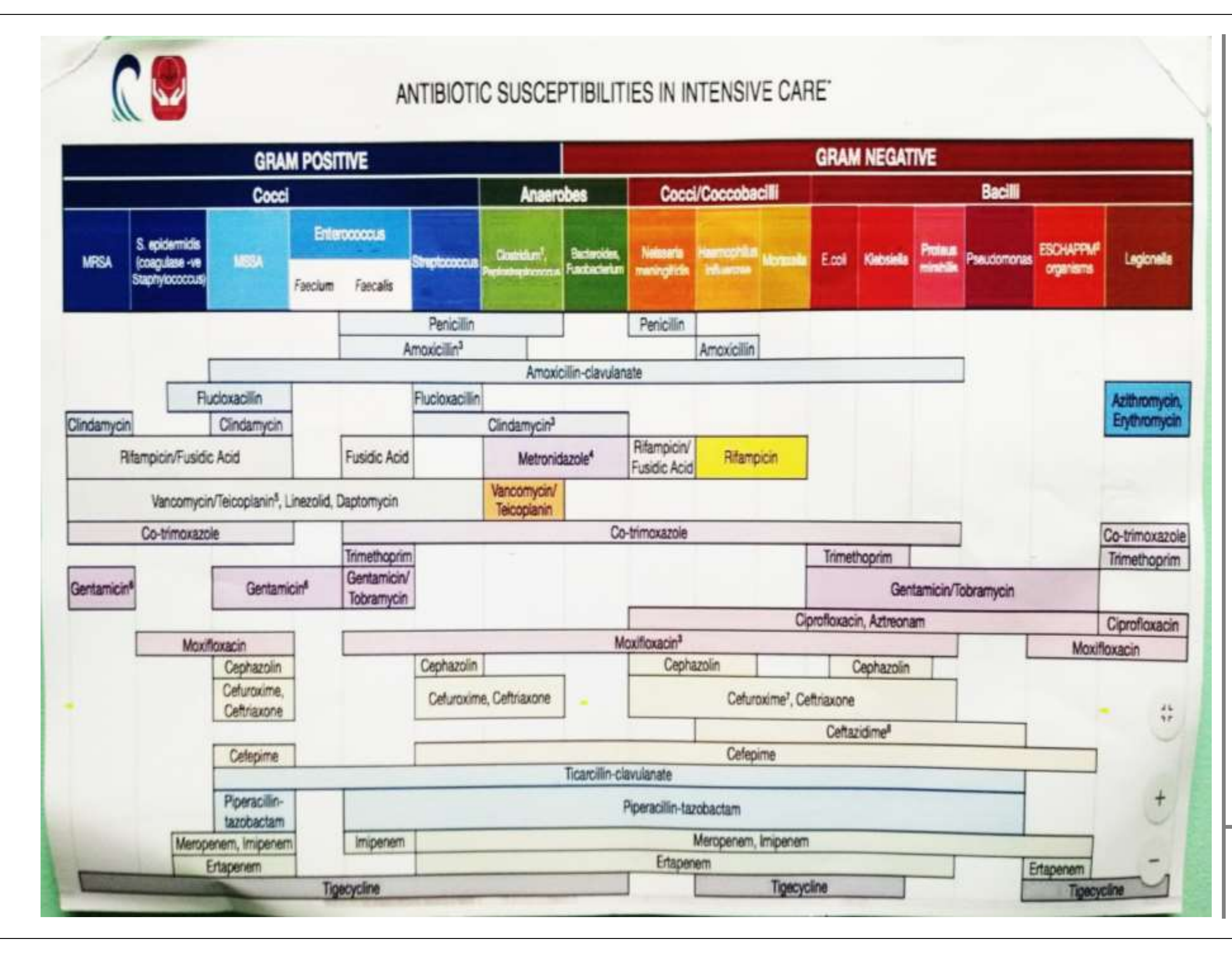
NB☞ Sulperazon can cause coagulopathy → If high INR (unexplained) keep in mind.

Course of antibiotic : generally 10-14 days

- HAP &VAP →7 days may be longer according to clinically + Images + labs
- Baceremia →7-14 days
- Baceremia with acineto →10-14 days
- Necrotizing fasciitis →until further debridment is no longer necessary + fever resolved +clinically improved
- Infected necrotizing pancreatitis →4 weeks
- هام Fungal bacteremia (candida) →2 weeks after negative blood culture every 48hrs (change CVL , 3 days with peripheral cannula)
  - مفيش حاجة اسمها candida sputum = contamination
- Liver abcess →4-6 weeks

NB:⁎***dose of teinam in Medscape : douple dose***

Eg : 250/6 hr in Medscape →500/6 hr


ANTIBIOTIC SUSCEPTIBILITIES IN INTENSIVE CARE*
GRAM POSITIVE
GRAM NEGATIVE
Cocci
Anaerobes
Cocci/Coccobacilli
Bacilli
MRSA
S. epidermidis (coagulase -ve Staphylococcus)
MSSA
Enterococcus
Faecium
Faecalis
Streptococcus
Clostridium, Peptostreptococcus
Bacteroides, Fusobacterium
Neisseria meningitidis
Haemophilus influenzae
Moraxella
E.coli
Klebsiella
Proteus mirabilis
Pseudomonas
ESCHAPPM organisms
Legionella
Penicillin
Penicillin
Amoxicillin
Amoxicillin
Amoxicillin-clavulanate
Flucloxacillin
Flucloxacillin
Azithromycin, Erythromycin
Clindamycin
Clindamycin
Clindamycin
Rifampicin/Fusidic Acid
Fusidic Acid
Metronidazole
Rifampicin/ Fusidic Acid
Rifampicin
Vancomycin/Teicoplanin, Linezolid, Daptomycin
Vancomycin/ Teicoplanin
Co-trimoxazole
Co-trimoxazole
Co-trimoxazole
Trimethoprim
Trimethoprim
Trimethoprim
Gentamicin
Gentamicin
Gentamicin/ Tobramycin
Gentamicin/Tobramycin
Ciprofloxacin, Aztreonam
Ciprofloxacin
Moxifloxacin
Moxifloxacin
Moxifloxacin
Cephazolin
Cephazolin
Cephazolin
Cephazolin
Cefuroxime, Ceftriaxone
Cefuroxime, Ceftriaxone
Cefuroxime, Ceftriaxone
Ceftazidime
Cefepime
Cefepime
Ticarcillin-clavulanate
Piperacillin-tazobactam
Piperacillin-tazobactam
Meropenem, Imipenem
Imipenem
Meropenem, Imipenem
Ertapenem
Ertapenem
Ertapenem
Tigecycline
Tigecycline
Tigecycline

Antifungal drugs

Yeast : round →candida

Hyphene if acute angle →asperigillus →v fend , if obtuse →mucore →amphotrcin B

لو شاكك فى fungal infection وهتبعت مزرعه لازم تحدد وتقول fungal

Polyenes	**Triazole=azoles**	**Echinocandins**	**Others**
➢ Amphotericin B (ambisome ,fungisome) ➢ Nystatin	➢Fluconazole (diflucan) ➢ Voriconazole (v fend) ➢Itraconazole (arozol) ➢Posaconazole	➢ Anidulafungin (Ecalta) ➢ Caspofungin (Cancidas) ➢ Micafungin (Mycamine)	-Flourouracil

***Ecalta not given in pediatrics.** ***Itraconazole loading 600mg ,maintanence100/12hr**

Spectrum of antifungals		Amphotericin B	Nystatin	Fluconazole	Itraconazole & Voriconazole (v fend)	Echino-candins	5-FC
Yeasts	C. albicans	X	X	X	X	X	X
	C. glabrata	X	X	X	X	X	X
	C.parapsilosis	X	X	X	X	X	X
	C. krusei	X	X		X	X	X
	Cryptococcus	X	X	X	X		X
Molds	Aspergillus	X			X	X	
	Mucorales	X					
	Fusarium	X			X		

N.B : candida in blood 1- remove CVL unless on inotropes , change it

2- 3 days with peripheral cannula 3- blood culture every 48 hours +fundus examination

4- Antifungal drug will be containued till 15 days from last negative culture

- urinary candida : a)Albicans b)count ≥ 100,000 c) symptomatic →difflucan or amphotericin b

Amphotricin B : to decrease toxicity :

1)proper hydration : 500 ml saline before and after

2)In case of shivering give: brufen to decrease shievering

3)avil +solucortef **4)over 4 hrs**

5)photosensitive : proper coverage(fungizone) 6)hepatotoxic nephrotoxic+ hypokalemia

Steven johnson syndrome:

Aggressive dermatological disease affect skin &mucous membrane ,it usually reaction to medication as :

- antigout medication eg : allopurinol
- antiepileptics eg : phenytoin , carbamazepine and lamotrigin
- antibiotics eg penicillin , sulfa drugs and cefixime
- pain relievers such as acetaminophen , ibuprofen

clinical picture (as burn):

- fever ,sore throat , fatigue,burning eye
- unexplained widespread skin pain
- red or purplish rash
- blisters on the skin and mucous membrane
- shedding of skin ithin days afterblisters

investigation

- skin biopsy
- culture :skin to confirm or rule out infection
- imaging : CXRor CT chest to exclude pneumonia
- Blood test : to confirm infection or otherpossible causes

Complication :

- Dehydration
- Sepsis (blood infection)
- Eye problems
- Lung involvement
- Permanent skin damage

Treatment :

- Supportive treatment (ABC +as burn without parkland)
- Topical steroid
- Antibiotics to control infection when needed
- ± Depend on severity may need oral corticosteroids and IVIG ???(Debatable)
- **± Neural (immunosuppressant) ±IvIg**

Dose	Caspofungin (Cancidas)	Anidulafungin (Ecalta)	Micafungin (Mycamine)	Fluconazole (Diflucane)	Voriconazole (V-fend)
General dose	Loading: 70 mg Maintenance: 50 mg/24 hrs	Loading: 200 mg Maintenance: 100 mg/24 hrs	100 mg /24hrs	Loading: IV: 800 mg (12 mg/kg) Maintenance: 400 mg /24hr (6 mg/kg)	IV: 6 mg/kg/12 hrs for 2 doses; 4 mg/kg/12 hrs Oral(better) :400 mg/12hrs ;200/12 hrs Obese :use IBW; severe infuse ABW
Intravascular infections (endocarditis, cardiac devices, suppurative thrombophlebitis)	150 mg daily	200 mg daily	150 mg/24 hr (also in esophageal & aspergillosis		Step down; 200-300 mg/12 hrs
Renal impairment	**X**	**X**	**X**	CC <50%: full loading then 50% of maintenance	CC <50%: oral, May use IV loading
Liver impairment	Child B or C 70 mg; 35 mg /24 hrs	**X**	**X**	**X**	Child A,B: Maintenance dose → 50% Child C: not studied
Pediatrics	Loading: 70 mg/m^2/dose Maintenance: 50 mg/m2/dose Maximum: 70 mg/dose	No data <18 years		IV: 12 mg/kg/24 hrs CC: 10-50 → 50% of maintenance dose CC < 10 → 50% of dose /48 hrs	Loading: IV: 9mg/kg/12 hrs Maintenance: IV 8 mg/kg/12 hrs Oral: 9 mg/kg/12 hrs (max: 350/dose)

Traumatic Brain injury

7

1) ABC Trauma survey Cervical spine

1. Neurological assessment
2. Stability
3. Binder & Fixation
4. Imaging
5. ± Solumedrol

2) ↑ Supply CPP= mean- ICP

الضغط و محتواياته

1. MAP
   a) Hb
   b) Avoid hypoxia
   c) Avoid hypo/ hyperglycemia
2. ↓ ICP

3) ↓ Consumption

1. Antiepileptics
2. Avoid fever
3. Hypothermia

4) Medications

1. Antiepileptics:
   a) Tiratam
   b) Epanutin
2. Additives:
   a) Inderal
   b) Kapron
3. Brain stimulants:
   a) PK Merz
   b) Nootropil
   c) Cerebrolysin
   d) Melatonin
4. Contraindicated:
   a) Steroids
   b) Albumin
   c) Maxipime
   d) Tienam

5) Polyuria

1. DI
2. Cerebral salt wasting
3. Normal Na

6) Tracheostomy

1. GCS < 6, Day 4
2. Trachea مهرية
3. Secretions و ما بيكحش
4. Obese و ما بيحكش

7) Others

1. Bed sore
2. Physiotherapy
3. CL/ 4 hrs.
4. DVT prophylaxis
5. Aneurysm
6. Pneumocephaly
7. Contusion & Hge

✪ **Any Trauma:** - ABCDEF - Trauma Survey

- Management of emergency (e.g. rupture spleen)

1. Care of cervical spine: ***5 اسئله***

Any fracture spine →

1) do neurological assessment
2) ask about fracture stability (يتقلب ولا لاء),
3) need for binder with metallic pillar ?? need for fixation??
4) need for imaging including MRI
5) ± Solumedrol.

N.B(MRI for soft tissue, cord contusion &ct for fracture bone)

1. The patient should be on a hard surface wearing a neck collar.
2. Cervical spine should be at the same level with the head & shoulder.

إزاي تنقل العيان؟ هدفك إن الـ shoulders, head & neck يتنقلوا one unit فيا إما:

3- على hard board أو

4- إيديك الاثنين تحت اكتافه زي الجاروف وراسه مسنودة بالـ forearms عشان تضمن إن راسه في نفس مستوى اكتافه فترفعه one unit الا لو عربيه بتتحرق

Neck collar (prevent flexion & extension)

☞**Types** a)Philadelphia(in tracheostomy) b)Hard c)Sponge

3. Solumedrol (IV infusion):a) loading dose is 30 mg/kg over 15 mins (about 2 gm), then 5 mg/kg/hr (about 350 mg/hr) for 24 hours if started within 8 hours from the time of trauma .

b)(500mg/6hrs) empirically ,stability 48 hr

★Solumedrol has no role in case of complete avulsion of the cord or after 8 hrs.

. (Add PPI ,check RBS)هام جدا.

N.B: in traumatic brain hge & contusion : 1gm kapron should be administerated على التروللي أول ما تشوف العيان then 1gm daily over 8 hr

. هام جداon admission +ct brain after 24 hr or with any deteroration in CL

Differential diagnosis of DCL

a) Intra-cranial:

★ **Trauma:** hemorrhage, contusion, compound depressed fracture & diffuse axonal injury(Normal ct & causes free (by exclusion) → then MRI ē diffusion &EEG).

★ **Infections:** brain abscess, meningitis, encephalitis1-signs:neck rigidity2- symptom:fever → 3-Investigation:CSF chemistry(ptn , sugar & LDH), cytology & culture سرنجتين 4-Imaging:MRI with contrast).

NB RBS should be assessed 2hr before CSF sampling بالابره صفرا(very thick=18)

★ **Tumor:** brain tumor.

★ **Others:** eg. MRI e diffusion(stroke,subclinical fits) esp un explained post operative(neurosurgery)→with free CT brain post operative , hypertensive encephalopathy & epilepsy.

هاماNB:The most common causes of postoperative DCL in neurosurgery are:

sbclinical fits or stroke (mostly normal CT)

b) Extra-cranial:

1★ **Drugs:** addiction (trauma+DCL+CT free →toxocolgical Screening (urine& blood) & iatrogenic (e.g,dormicum).P(201)

2★ **Blood gases abnormalities:** 1-severe acidosis or alkalosis 2- hypercapnia 3-hypoxia, 4-hypoglycemia 5- electrolyte disturbance.

3★ **System failure:**1- hepatic encephalopathy 2- uremic encephalopathy3-Addisonian crisis 4-myxedema coma.

4★ **Severe sepsis.**

5★**Other endocrinal** eg:DKA, hyperosmolar hyperglycemic

هام جدا ☞ *Follow up conscious level every 4 hours & perform immediate CT after 24 hr or in case of drop of conscious level.if the patient has brain contusion (وابعت على الواتس document) وعلى history &pupils& lateralization← (intracranial or extracranial)لو مش عارف تنقله شغل مخك اساسه تاخد ال risk النقل علشان لو عمل عمليه المخ هيعيش*

- ***Any sudden drop in conscious level not explained by CT ,you should do MRI to exclude infarction& EEG***

Causes of delayed recovery :

a)ABG(gas exchange or acid base)

b)Brain (perioperative stroke , brain pathology ***لو طوّل اكتر من ساعة اعمل CT***

c) Cold ***d) Drugs (residual effects: narcotics & sedatives)***

e) Endocrine (myxedema) , Electrolytes ,End organ

f) Glucose (hyper or hypoglycemia) esp. in pediatrics

g)Hysterical

♦ ***Primary insult:*** occurs at time of trauma & can’t be treated الحتة اللي اتخبطت وماتت خلاص

♦ ***Secondary insult:*** ischemic brain injury that occurs after the initial trauma had occurred.

المنطقة اللي حولين الحتة اللي ماتت (ممكن تموت نتيجة الـ ischemia & inflammation لو حصل
2ry injury هدفك إنك تمنع الـ ... (hypoperfusion or hypoxia

Goal (to avoid 2^{ry} brain insult ischemic penumbra)

2. ↑Oxygen supply to the brain = ↑CPP
CPP = (A)MAP – B)ICP

MAP= (A) ضغط + محتواياته

1. MAP: keep it > 65 mmHg (> 80 mmHg in hypertensive patients if perfusion is improved or↑ICT).
N.B. Cerebral autoregulation: MAP 50-150.
2. Hemoglobin: > 9 gm/dl.
N.B. Scalp hematoma in pediatrics may lead to severe anemia.
3. Avoid hypoxemia: keep SO_2 > 90%.
4. Never hypo or hyperglycemia

(B) Reduction of ICT:

Intra-cranial Pressure (B) of ↑supply

- ICP is formed by the brain (80%)& blood (12%)& CSF (8%) **BBC**
- ICP: 12-15 mmHg. ■ IOP: 15-20 mmHg.
- ↑ ICP: 1. CSF displacement (to spine)
  2. ↓CSF production or ↑absorption
  3. Brain herniation
  4. Finally conization → **Cushing triad** →
  1) hypertension,2) bradycardia &3) irregular breathing

يعني بتيجي في attacks بتاخدلها 1-1.5 min وبتقف عشان بيحصل drainage لشوية CSF فالضغط على الـ centers يقل فيفك وبعدين الـ tension يعلى تاني فيضغط على الـ centers تاني فيدخل في hypertension & bradycardia تاني وهكذا .

Methods to reduce ICP (APCDEFGTS)

1. Airway: smooth intubation .(most expert in 15 sec)
- ➢ Adequate pre-oxygenation & analgesia → fentanyl (2-3 mic/kg) ... Avoid morphine.
- ➢ Adequate muscle relaxation → sux or tracium, consider pre-curarization by 10 mg tracium

هام Give a muscle relaxant even if GCS < 8 to prevent cough reflex → to avoid ↑↑ ICT.
Give a muscle relaxant or deep sedation during transfer of intubated patients with TBI to p
cough reflex ...

- ➢ Adequate hypnosis without affection of BP (diprivan titration).
- ➢ XylocaineP259→ 1)gel on tube 2)spray on vocal cords 3) IV Use β-blocker & Magnesium
- ➢ Avoid tridil as it ↑↑ ICT … Trimetaphan (ganglion blocker)The only vasodilator that can b to ↓↓ BP without ↑↑ of ICT.
- ➢ Avoid sympathomimetics, para-sympatholytics, katalar, hypoxia & hepercapnea.

NBنصيحه للمخ يادوب ال cuff تعدي الـ cords ,, most expert (15 sec.) ,

1- محاليل دافيه وقطن ملفوف &2-(حط زيلوكين فى جفنة الحقن& ( ) (scalp block or local infilteration P

➢Cidamex (carbonic anhydrase inhibitor):check K(hypokalemia), acidosis

2. Positioning: 3 & 30

a) 30 º - 45º Head elevation with central head positioning to allow drainage of IJV.

b) ≥ 3 fingers between angle of mandible & clavicle, ≥3 fingers between chin & suprasternal notch

ليه30^O ؟؟ لأن ده أحسن وضع يحصل فيه venous drainage كويس من غير ما الـ blood supply يقل .

c) C ازازتين محلول ملفوفين بملايه يتعملوا زى طوق سواقه حرف

3. Controlled Ventilation: 3 gases

➢ Target PO_2 > 60 mmHg, SO_2 ≥ 90% on the less FIo2

➢ Target PCO_2: 30-35 mmHg.

To achieve hypocapnea →↑TV is more effective than ↑RR as alveolar ventilation = (TV - dead space) x RR. **(except poor compliance)**

e.g: Minute ventilation = 600 x 10 = 6 liters.

AV = (600-200) x 10 = 4 liters   AV = (600-200) x 12 = 4.8 liters

AV = (700-200) x 10 = 5 liters

➢ All inhalational anesthetics ↑ ICP by cerebral vasodilatation: (so TIVA is an option)

Halothane increases ICP by 200%. This effect is reduced by hyperventilation before introducing it.

Isoflurane increases ICP by 50%. This effect is reduced by concomitant hyperventilation.

NB: Avoid severe hyperventilation →↑ cerebral ischemia

4.Drugs:

➢ Mannitol: (if Na >160 ,stop mannitol) لو ماشي هتنسي توقفه

علي الزجاجة مفيهاش crystals و ترج جيدا (لو فيها حطها في ميه سخنه)ولو فى وفرة فى الأزايز استخدم واحدة جديدة

♦ Dose: 0.25 - 1 gm/kg … Onset: 15 min, maximum effect: 45 min, duration: 6 hrs.

NO BENEFIT FROM INCREASING THE DOSE > 1 GM/KG → ↑ duration of action without ↑ effect.

♦ Mechanism of action (1) osmotic diuretic,

(2) anti-oxidant (scavenger for oxygen free radicals)

(3) initial hemodilution → ↓ blood viscosity .

♦ Contraindications: (1) severe cardiac

(2)renal (oliguria or anuria)

(3) intracranial hemorrhage.

جدا عينك على trend of UOP لو فضل كمية كبيرة مش بيقل مع الوقت وقف المانيتول وابعت صوديوم لانه غالبا هيعلى لان الطبيعى بتاع المانيتول ان البول يبقى كتير بعدين يهدى

➢ Lasix:1) loop diuretic + 2)↓ CSF synthesis +3) synergistic effect with mannitol.

➢ Precedex (dexmedetomedine) & Aminophylline.

➢ Magnesium.

➢ Xylocaine infusion: 1-4 mg/minute.   Xylcaine toxicity p( )

➢ TIVA (total intravenous anesthesia)(propofol): بشرط الضغط يستحمل → 10 mg/kg/hr in 1st 10 min → 8 mg/kg/hr in 2nd 10 min → 6 mg/kg/hr after that.OR 12-15 mg/kg/hr continuously if electrophysiological monitor

*Give initial dose of muscle relaxant in anasthesia

- ➢ Ms relaxant عمليات من غير→Electrophysiological study →stimulation of cortex to detect ms action (facial / spinal cord surgeries)
- ➢ Cereblolysin not in1- convulsion and 2-renal ,Nootropil not in hemorrhage.
- ➢Hypertonic saline 3-5 ml/kg/6 hr over 10-20 min. every 3-6hrs & check Na every 6-8hr target Na 145-155 meq/l تأثيره مش مؤكد بيفرق (كبديل للمانيتول.)

5. Electrolytes: correct electrolytes especially after mannitol intake or Lasix (k,mg,ca) .

6.Fluids:

♦ Avoid :

a) hypotonic fluids

1- half normal saline, 2- Ringer acetate 3- Ringer lactate 4- G5%

. Normal saline should be avoided as well in large volume 2.5-3 litre(Hypercholremic metabolic acidosis (give ringer) .

b)glucose containing solutions,

c)- Avoid hypervolemia.

7.Glucose: avoid hypo & hyperglycemia ... Both are equally injurious.

8. Heat: avoid fever as every ↑1°C above 37°C → ↑CMR by 7%.

9. Surgical Intervention:

تخديرIntrathecal drainage (20-40 ml of CSF)

جراحهdecompression craniotomy or evacuation of hematoma if present or CSF.

3. ↓Oxygen consumption by the brain(3 points)

1. Anti-epileptics: (routine in TBI or supratentorial tumour)

♦ Convulsions increase cerebral O_2 consumption by 300%.

♦ If no convulsions occurred → give anti-epileptic for 1 week only.

♦ If convulsions occurred → continue anti-epileptic for 6 - 12 months.

♦ Infra-tentorial injuries(cerebellar, brain stem or deep white matter injuries are not indications for anti-epileptics being away from motor areas.

♦ Any attacks of rigidty, tachycardia or eye rolled up → consider sub-clinical fits → do EEG, CT or MRI with diffusion + Epanutin or other antiepileptic level.(uncontrolled serum level)

♦ Status epilepticus → give maximum doses of dual anti-epileptic drugs IV + diprivan or dormicum or katalar infusion for 48 hrs then do EEG شروطه →

(1-stop any sedation before doing EEG 2- during attack or continuous for 48hr)

→ if controlled → stop infusion.p(199) لازم تقف بسرعه التشنجات .

If EEG is not available → decrease the dose of infusion gradually 20% daily

if recurrent add 3rd drug + levels+Image

NEVER to give a muscle relaxant to stop convulsions → كده البوردة هتتحرق في صمت

2. Avoid fever: because rise of temperature by 1°C → ↑CMR by 7%.

3. Hypothermia: controversial but avoid hyperthermia.

4. Medications (11 items)

1■ PK Merz(amantadine): contraindicated with uncontrolled convulsions or agitation (هام جدا) used with cautious in renal pt

as it may worsen them (stop it immediately with convulsion).

Dose: 5 mg/kg → start with IV form for at least 5-7 days (500 ml (200mg)/ 12 hrs) then 1bottle for 21 days either continue IV or oral. بيتنسي نقفل ورق العلاج بعد 5-7 ايام

It should be adjusted in **renal patients هام جدا**. give it with percautions

Preparation: IV infusion bottle: 500 ml containing 200 mg & oral tablets containing 100mg

2■ Melatonin: facilitates restoration of physiological rhythm النوم والصحيان & improves conscious level .

Dose: 3-10 mg/day. Can be increased up to 20 mg/kg/day in brain edema. عندنا 3-10 mg/day

3■ Epanutin (Phenytoin):

type 1B antiarrythmic interacts with :

a) procorolan

b) nimotop

c) Epilat

d)new oral anticoagulants.

e) Berlique

Replaced with tiratam in case of ↑↑liver enzymes.

Dose: loading 15-20mg/kg ,maintainance.5-7mg/kg/d on 3 divided doses.

Don't dilute with glucose , maximum rate of infusion **50mg /min (as vanco)**

amp =(250mg/5ml) or (100mg/2ml)

≠bolus→severe hypotension &bradycardia up to arrest …serum level 1 hr before dose .

-dose in morbid obese:

adjusted body weight =ideal body wt +(actual B. wt –ideal B. wt)*0.4

-The result x 15 mg→max. 2 gm ,assess level after 2 hrs if low u can give half the equation dose.

- Corrected phenytoin level = measured / (0.2 x albumin) + 0.1

4 ■ Tiratam (Levetiracetam): available in a)IV form (vial 500 mg),b) tablet c) syrup forms.

The coated tablets should not be crushed → if cannot be swallowed → give the syrup form.

It should be adjusted in **renal patients.**

Dose : loading 1500mg - 4500mg(in status) then 20-60mg/kg/day Max. 3 gm/day, two divided dose, start with low dose unless in status

5■ All **steroids** are contraindicated in TBI. It may worsen the prognosis.**unless** contusion surrounded by brain edema . **N.B** Decadrone has No role in TBI

6■**Albumin** is contraindicated in severe TBI GCS < 8

7■ **Maxipime & Tienam** → ↑risk of convulsions especially in renal patients.

8■**Cerebrolysin** →not in convulsion nor renal

9■**inderal** : start with 20mg/12 hr then escelate in any patient

a) GCS <12 and b)hemodynamically stable+↓central fever +↓sympathetic over activation.

10■.**Nootropil** →CI in He ± **11■**. cyclokapron 1 gm shot then 1 gm over 8 hrs

12■Drugs with good penetration to CSF p (209)

NB: **drugs are contraindiacted in TBI with renal impairement** :

PK merz . cerebrolysin , maxipime & Teinam

Signs of brain edema in CT (بالترتيب ده)

1. Occluded basal cistern. **2.** Obliterated sulci & gyri. **3.** Compressed ventricles

5. Polyurea in neurosurgical patient

♦ Keep an eye on Na^+ level/8hrs. "2-3 times per day" +balance / 4 hrs

♦ Differential diagnosis: diabetes insipidus or cerebral salt wasting.

♦ Plasma osmolality =

$$(2\ x\ Na) + \frac{Glucose}{18} + \frac{BUN}{2.8} \rightarrow (2\ x\ 140) + \frac{90}{18} + \frac{14}{2.8} = 290 \text{ mosm/kg } (275\text{-}295).$$

♦ Accepted Na level in neurosurgical patient is 160 in case of brain edema ,stop mannitol and follow up Na every 8 hrs . once ذكّر Na → كل 8 ساعات

a)Diabetes insipidus	*b)Cerebral salt wasting*
➢ High serum Na^+ ➢ Give minirin (desmopressin) **a-** tablets:initial 0.05mg/12hr Range : 0.1-1.2 mg/8-12hr or **b-** nasal spray: precautions : 1-No nasal clots mucosa لأن ساعتها مش هيوصل له 2- Kept in a refrigerator. 3- keep it upright on administration. **c-**Sublingual melts tablets are also available initial: 60mcg/8hr Range: 120-720mcg/8-12hrs. ➢ Investigations: a)24 hr urine for osmolarity b) Na serum level.	➢ Low serum Na+ ➢ Give Astonin-H (fludrocortisone): 0.2-0.4 mg/24 hrs (2-4 tabs) ➢ Self-limited conditions. ➢ Investigations: a)24 hr urine for osmolarity b) Na serum level.

c)normal Na +FC: stop diuretics +if normal Na ,BP,Hr ماتعوضش وماتحطش ادويه
d)Nephrogenic DI :pt not responding to minirin >>>consult nephrologist.

- Autoregualtion of all organs is MAP 50-150 mmHg except the kidneys → 80 - 180 mmHg. يعني ده range of MAP اللي الـ organ يقدر يتعامل معاه من غير ما يحصله damage ... يعني لو الضغط زاد في الرينج ده هيحصل vasoconstriction في الـ organ vessels فيقلل الدم اللي واصله وميحصلوش damage زي hemorrhage ... أو لو الضغط قل هيحصل فيه vasodilatation فيزود الدم اللي واصله وميحصلوش ischemia .
- Renal autoregulation depends on prostaglandins → don't give NSAID in hypotensive anesthesia as it will interfere with renal autoregulation.

- **Sedation of neurosurgical patient:**

1) Precedex(amp.200mic)maintains adequate cough (1mic /kg over 30-60 mins loading (1/2amp)then 0.2-0.7 mic /kg /hr maintainance (5-10cm/hr), SE:bradycardia ,hypotension ,
2)Haloperidol, 3)Seroquel(25-50-100) /8hr-12hr-24hr or 4) resperidal.

Haloperidol forms: 1.Oily (IM) العلبه 1 امبول → 50 mg .
2. Watery (IV) العلبه 3 امبولات→ 5 mg-2.5mg titration maximum 30mg.

- Haloperidol has extrapyramidal manifestation →كلم النيورو قبل اعطاؤه

5) Olapex in COVID pt

6. Indications of early tracheostomy

1. GCS < 6 on day 4 → dilated fixed بس ميكونش بيموت أو
2. Bronchoscopy showing sloughed tracheal mucosa مهرية
3. Excessive secretions with inadequate cough
4. Morbid obese with inadequate cough

7. Others

1. In case of DCL, follow up conscious level every 4 hours تكتب ورقة ع الحيطة و تمضي عليها بنفسك لو الCLبتاع العيان وقع اعمل CT brain وبلغ مخ وأعصاب ع الواتس Document (as lactate, AKI , hemorrhage&ARDS)

2.Physiotherapy & out of bed: very important in neurosurgical patients as many of them die from chest infection & DVT. (30% better prognosis)

3.Complications of posterior fossa intraoperative;-**a**-Obstructive hydrocephalus. **b**-Sitting position. **c**-Stimulation or injury of brain stem.**d**-Pneumocephalus &tension pneumocephalus. **e**-macroglossia. **f**-Postural hypotension.

العيانين دول بيحتاجوا طوق لرقبتهم و castلرجلهم علشان ماتبقاش planter flxion وده نوعين نوع رخيص وبيعور فتلف قطن حواليه يااما نوع بلاستك غالي after surgical consultation

4. DVT prophylaxis: prophylactic anti-coagulation on day 4 or pneumatic cuff (هام).
5. Bed sores prevention & managementمرتبة هوائية و جدول تقليب تمضي عليه بنفسك: see.p(20)
6. Cerebral aneurysm(subarachnoid hge) : after coiling or clamping aneury

Problems with Ruptured aneurysm may present by Sub-arachnoid hge or Spontanous intracerebral hge ± malignant HTN

Complications:

1-Rebleeding: greatest risk 24 hrs after he , then peak again about D4-D21

Day (0) (1) (4) (14) (21)

Bleeding clamp or coil أحسن وقت اعمل فيه spasm Rebleeding

2-spasm: D4-D14 after bleeding

Prophylaxis :(Euvolemia , avoid hypotension, normal Hct)

triple H (hypervolemia ,hemodilution , hypertension) Not recommended now.

→a)target BP is 50% higher than baseline after coiling even if required levophed + nimotop(to get the benefit without hypotension).

🗐Nimotop prevents spasm(60mg PO /4hr for 21days) →ممكن يوطي الضغط فممكن أسند بمحاليل

→b)avoid hyperventilation ,keep the patient normocapnic.

→c)Rare Optic nerve decompression in case of massive papilledema or hematoma+ cidamex (carbonic anhydrase inhibitor check K ,acidosis).

d) 1)Tiratam + nimotop (oral or i.v)

2) contraindicated the combination of :epanutin + nimotop(procrolan,NOAC,epilate,berlique)

3-hydrocephalus

☞ Patients who undergo coiling with stent insertion for large-based intracranial aneurysm should be given dual anti-platelets. "Plavix 1 week then aspirin for 6-12 months

🗐Follow up CL every 4 hrs → if dropped consider complication

🗐Spasm (detected by transcranial doppler) clinical picture like stroke ,best prognosis if managed early before infarction appears in CT

قبل ال clamping ينزل الضغط ل 140-150 بعد ال Coiling or clamping يرفع الضغط لأكثر من 50%

6. Management of pneumocephaly → a)position 30° & b)high flow oxygen .

c)الدرنقة ممكن تكون السبب /بتسحب هوا

d)if massive or no improvement consider burr hole وتغسل تطلع الهوا

7. Contusion (intracerebral hge) may be associated with ischemic changes

8. Paralysis → Hemiplegia [brain or cervical spine] →CT or MRI

→Paraplegia [Lumbar mainly, rarely brain or cervical]→vascular من أسبابها

Proximal or distal	}	Nerve conduction velocity
Ascending or descending		EMG
Diurnal		Consider MS / Mysthenia

→Monoplegia [Brain /brachial plexus / bone / muscles / vascular]:

Any lateralization = Central cause

NB: CSF & bleeding in T1 in MRI appear black ,in T2 appear white

9.**Management of headache** a)<u>secured</u> <u>aneurysm(clamping)</u> 1.ketolac 2.brufen 3.paramol

b)<u>non-secured</u> 1. Paramol or perfalgan

<u>In resistant cases</u> of both types add magnesium 4gm/4hrs or dexa 4mg/6hrs for 48hrs or **nalfu**in.

Status Epilepticus.

➢**Aseizure that lasts more than 5 min.,or having more than 1 seizure within a 5 min. without returning to a normal level of consciousness between episodes.**

➢**<u>Etiology</u>** = causes of DCL P()+

1-Familial/genetic or infantile 2-Neurodevelopmental brain abnormality 3-Idiopathic.

1)IV hypnotic agent up to 3 drugs as

a)Katalar infusion(loading1.5mg/kg (max loading 5mg/kg) then(2.75-10 mg/kg/hr)for 48 hrs.

b) Dormicum : 0.2 mg/ kg boluse up to 30 mg , infusion :0.05 – 3 mg/kg / hr .

c)Propofol : 1-2 mg /kg bolus then 30-60 mcg /kg*min =180-360 mg / hr = 18-36 ml/hr if propofol 1%, If propofol conc 2 % →half dose

d)Intraval :2-3 mg /kg loading dose then infusion 3-5 mg /kg /hr up to 15 mg /kg /hr

e)Magnesium loading dosse for seizure prophylaxsis and treatment 4-6 gm over 15 mins then 1gm /24 hrs **ونبص على الكلاوى**

القصه كلها معتمده على ضغط وكلى

- لو ضغطه يسمح يبقى diprivan .. لو ميسمحش والكلى كويسه يبقى dormicum
- (ماتتحركش الا بعد ماتقفل) consider CT .
- لو ميسمحش وعنده renal impairment يبقى katalar .. لو katalar مش موجود ممكن تنيمه بـ diprivan وتسنده بليفو

2)Dual IV antiepileptic (maximum doses) + infusion (Bp & كلى)

a)Epanutine ±reloading (15-20 mg/kg loading, 5-7mg/kg maintainance)

b)Tiratam 1500 - 4500mg + maintainance (20-60mg/kg / day on 2 divided doses)

3)±3rd or 4th drug p(153)حسب جدول + neurology 4)CT&EEG

5)Level (epanutin + Depakin)

6)± Nootropil (Lance Adams syndrome)

7))Never muscle relaxant كده البوردة بتتحرق في صمت unless with(1) EEG or(2) severly hypoxic

- If EEG is free for 48 hrs → stop infusion, consider sympathetic overactivity (blocked by propranolol (Inderal) 20 mg/12hr if GCS <12).
- If EEG is not available → ↓ dose of infusion gradually 20% daily.

- I.V : Epanotin , Tiratam , Andovimpamide (Lacosamide)
- لو العيان فايق و عنده focal fits مش بنيمه
- Corrected phenytoin level = measured / (0.2 x albumin) + 0.1

Lance Adams Syndrome V. poor prognosis

- Post-arrest convulsions(generalized myoclonic).(start from shoulder)
- Treatment: same as status epilepticus + Nootropil up to 9 gm plays a major role as it ↑↑ response to anti-convulsants.

NB:Antiepileptics causing steven johnson syndrome eg: phenytoin(epanutin) , carbamazepine(tegretol) and lamotrigin p(187)

Indication	First line	Second line	adjunctive
Post trauma prophylaxis	Phenytoin =epanutin Dose : loading : 15-20 mg /kg (adjusted) M:5-7mg/kg/d on 3 divided doses	Levitiracetam= tiratam Dose : loading 1500-4500mg/kg M:20-60 mg/kg/day max 3gm /d in 2 divided doses	
Generalized tonic clonic	Valproic acid =Depakin Dose: 10-15 mg /kg/day divided /12hr max 60 mg/kg /day Lamotrigine =lamictal Dose: 50 mg for 2w then 100 mg/day divided/12hrs Tegretol Dose: 800-1200 mg/day in divided doses max 1600 mg /day	Trileptal Dose: 300/12hr up to 1200mg /day Phenytoin	levitiracetam
Generalized myoclonic	Valproic acid	Topiramate = Topamax 25mg/12 up to 200 mg/12hrs	Levitiracetam
Focal	Tegretol Lamotrigine Lacosamide Dose:100mg/12hrs up to 300-400mg/d	Trileptal Valproic Phenytoin	Gabapentin =gaptin =Neurontin Dose:300mg/8hr up to 2400mg/day levitiracetam

- NB: Focal Status Epilepticus is treated like generalized convulsive status epilepticus with a higher priority to avoidance of sedation and intubation (only intravenous antiepileptic agent) while benzodiazepines reserved only to complex partial status epilepticus also without aggressive ICU management **(UPTODATE /SPRINGER)**
- **Lacosamide** (adjunctive in UK while 1st line in ACCP 2019 updates)

Leveling
• **Phenytoin** 1st- -> after 2 h of LD 2nd/after MD adjust.-> within 5-7 D Ref (10-20)
• **Valproic acid** after 3-4 D of initiation or dose adjustment Ref (50-100 mcg/ml)
• **Tegretol** after 5 days then after 2-3 weeks post titration (auto induction) Ref (4-12)
Time of sampling : Trough levels required just before the next dose
If patient experienced an exacerbation of their epilepsy or signs of toxicity sampling is done immediately

<table>
<tr><th colspan="2">Interactions</th></tr>
<tr><td colspan="2">Lamotrigine ,trileptal ,tegretol ,Phenytoin ,Gabapentin ,pregabalin are contraindicated in myoclonic seizures</td></tr>
<tr><td>Interaction D
CONSIDER THERAPY MODIFICATION
TEGRETOL +
• Trileptal/Phenytoin/topiramate
• Warfarin /Amiodarone /Caspofungin
PHENYTOIN +
• Trileptal
• Warfarin
• Voriconazole / Fluconazole /Caspofungin
VALPROIC ACID + Meropenem</td><td>Interaction X
CONTRAINDIACTION
PHENYTOIN / TEGRETOL +
• ALL NOACS
• IVABRADINE
• NIMODIPINE
• NIFEDIPINE
• BRILIQUE
TEGRETOL +
VORICONAZOLE</td></tr>
<tr><th colspan="2">MOST COMMON ADVERSE EFFECT</th></tr>
<tr><td colspan="2">• Hepatotoxicity ---> Tegretol /Trileptal /Phenytoin/Valproic
• Dermatological /Hematological Toxicity -- -> Tegretol /Trileptal /Phenytoin/Valproic /Lamotrigine
• AV Block And Conduction abnormalities ---> Lacosamide (PR prolongation) / Tegretol
• Hyponatremia ----> Tegretol / Trileptal
Hyperchloremic Metabolic Acidosis ,Acute Glaucoma ---> Topiramate</td></tr>
</table>

Delirium

☞Disturbance of consciousness with inattention accompanied by a change in cognition or percebtual disturbance that develops over a short period of time (hrs or days) and fluctuates over time.

Incidence: high & may reach 70% in mechanically ventilated pts.

Types: 1)Hyperactive 2)Hypoactive 3)Mixed

Assessment: a)CAM-ICU (Confusion Assessment Method for ICU)
b)ICDSC (Intensive Care Delirium Screening Checklist)

Risk factors 1-Age >70 yrs 2-Medically:HTN,ccf,stroke Hepatic
3-Social: smoker,alcohol abuse, malnutrition.
4-Enviromental: cathetrization, sleep deprivation. 5-Medication:benzodiazepines,opiates.
6-Acute presentation: sepsis , hypoxia,pain, metabolic

Prevention:

- **A** ➢ Spontanous Awakening
- **B** ➢ Spontanous Breathing
- **C** ➢ Choice of sedation
- **D** ➢ Delirium mointoring
- **E** ➢ Early mobility and Exercise
- **F** ➢ Family engagment

minimize sleep disturbance + minimize risk factor.

CSF drug penetration

ANTIMICROBIALS	CNS PENETRATION	CNS DOSE	Warnings and precautions	
AMPICILLIN/SULBACTAM	Good In case of meningeal inflame. /Disrupted BBB in surgery or trauma / SEPSIS Otherwise POOR penetration And a CNS high dose is a must	3g q 6 h	------------	ALL B LACTAMS ARE EPILEPTOGENIC, AND THE RISK OF CONVULSIONS INCREASE WITH RENAL IMPAIRMENT AND OLD AGE
PIPERACLLIN /TAZOBACTAM		4.5 g q 6 h	Decrease PLT	
CEFOPERAZONE		2g q 4 – 6 h max 12 g /day	increase INR	
CEFOTAXIME		2g q 4 – 6 h max 12 g /day	Arrythmia with rapid injection	
CEFTRIAXONE		2g q 12 h	Inc INR (RARE)	
CEFTAZIDIME		2g q 8 h	Inc INR /hemolysis	
CEFIXIME (ORAL SUPRAX)		400 mg q 24 h	hemolysis /renal	
SULPERAZONE		3g q 6 h	Increase INR	
CEFTAZIDIME/AVIBACTAM		2.5 g q 8 h	Decrease PLT	
CEFEPIME		2g q 8 h	Increase INR	
IMIPENEM/CILASTATIN	Same as above	500 mg q 6 1g q 8 h	The most epileptogenic	
MEROPENEM		2g q 8 h	---------	
ERTAPENEM	No data available	----------	Not recom.	
VANCOMYCIN	Poor in all cases	LD: 20 – 25 mg /kg actual body weight / dose (max 3g /dose) MD: 15-20 mg/kg/dose q 8-12 h IV + 5-20 mg q 24 h intravent/ thec. (Continuous infusion of 60 mg /kg /day after loading may replace intra vent/thec. injection in case of inflamed meninges ex: community acquired meningitis) SE: Nephrotoxic/ototoxic		
TEICOPLANIN	Poorer than VANCO	6 -12 mg/kg q 12 h for 3- 5 doses Then q 24 h	Nephrotoxic/ototoxic / cutaneous Rx / thrombocytopenia/neutropenia	
FOSFOMYCIN (monuril)	Very good	3g q 24 h for 7 ds then q 48 h	Monitor liver functions	
LINEZOLID	Very good	600 mg q 12 h	Lactic acidosis/myelosuppression onset >2 weeks /optic neuropathy with >28 days	
COLISTIN	Poor in all cases	SAME SYSTEMIC DOSE + 10 mg q 24 intravent/thec.		
RIFAMPICIN	Good	600 q 24 h	Hepatotoxic/myelosuppression/coagulopathy	
CLINDAMYCIN	Very poor	Not recommended	Diarrhea	
TIGECYCLINE	Poor	100 mg LD – 50 mg q 12 h	Hepatotoxic/coagulopathy/pancreatitis	
DOXYCYCLINE	Good	LD: 200 mg then 100 q 12h	Intracranial hypertension	
AMIKACIN	Poor even in inflamed meninges	5mg/kg q 8 h + 5- 50 mg intravent/thec q 24 h	Renal and ototoxicity Cannot increase dose due to toxicity so intravent/thec dose is a must	
GENTAMYCIN		1.6 mg/kg q 8 h+ 5 mg intravent/thec q 24 h		
CIPROFLOXACIN	Excellent	400 mg q 8 – 12 h	Qtc prolongation / aortic dissection / increased ICP /seizures / DCL /photosensitivity/hepatotoxicity/ disturbed glucose regulation	
LEVOFLOXACIN		750 mg q 24 h OR 500 mg q 12 h		
OFLOXACIN		400 mg q 12 h		
MOXIFLOXACIN		400 mg q 24 h		
AZITHROMYCIN	Good only with inflamed meninges	500 mg d 1- 250 mg q 24 h 4 ds	----------	
CLARITHROMYCIN		500 q 12 h	Qtc prolongation /liver toxicity	
Metronidazole	Very good	500 mg q 8 h	Severe neurological disturbances	
Sulfamethoxazole	Very good	5-10 mg /kg q 12h Bone marrow toxicity limit increase in dose/duration		

Correction of hyponatremia **1-ABC+2- ttt of the cause eg:acetoninH +3-Volume deficit +4-Na deficit**

Diagnosis

According to :a) causes b) cl/p c) Hormonal profile d) urine osmolarity

Causes : a)Hypovolemic: تجميع بول 24 ساعة و بناخد من ال container بسرنجة

(diuretics,↓ mineralocorticoid ,renal tubular acidosis(salt losing nephropathy), diarrhea, persistant vomiting ,cerebral salt wasting)correct hypovolemia by fluid boluses then correct Na & the cause

B)Normovolemic: (SIADH(syndrome of inappropriate antiduretics hormone) , ↓Glucocorticoid, myxedema)Na correction & ttt of the cause

C) hypervolemic: (CHF , Cirrhosis , RF , nephrotic syn)diuretics,fluid restriction then correct Na & the cause

♦ Target level: 130 mEq/L. except in hepatic 120

➢Hyponatremia in cirrhosis 1- ttt of the cause 2- fluid resuscitation 3-albumin IV 4- liver transpl.

♦ Calculate **volume & duration** to get the **rate of infusion.**

1. Volume

♦ Na^+ deficit (mEq) = (130 - current Na) x Total Body Water

♦ Calculate the required volume according to Na concentration in used solution.

☞ TBW in liters= 50% (0.5) of body weight in females, 60% (0.6) in males,70% (0.7) in pediatrics.

☞ e.g, Male 70 kg, serum Na^+: 110 mEq/L & using normal saline for correction :

Na^+ deficit (mEq) = (130 - 110) x (0.6 x 70) = 20 x 42 = 840 mEq.

Normal saline contains 154 mEq in each liter → So, volume needed = 840/154 = 5.5 L

2. Duration

♦ 0.5 -1mEq/hrبمعدل يزيد to avoid central pontine demyelination →quadriplegia, dysarthria &coma.

e.g,serum Na^+:110 → Deficit = 130-110 = 20 mEq/L → Duration: 20/0.5 = 40 hours or 20/1 =20 hrs.

3.Type of fluids :

♦ Manifested (i.e. DCL): use hypertonic saline if no central line , in peripheral line due to less complication than cvl insertion.

NB: **if hypertonic saline is not available** ,you can prepare it :

200ml sodium bicarbonate +300ml saline is equivalent to 500ml sodium chloride 3% →alkalosis هيعمل

♦ Not manifested (i.e. conscious): use normal saline.

4. Rate of infusion:

♦ 5.5 liters over 40 hours = 0.137 L/hr = 137 ml/hr.

هام جدا Assess Na^+ level every 8 hours during correction.

Correction of hypernatremia

♦ Treatment: **1-ABC+2-treatment of the cause** e.g a) **minirin in diabetes insipidus** b) if > 160 stop mannitol +3-volume dificit+ 4-water deficit ,

Causes: a)Hypovolemic (osmotic diuresis, excessive sweating, osmotic diarrhea,burn,diahrea)

Correct hypovolemia by fluid boluses 1st then correct ↑Na & correct the cause.

b)Normovolemic(DI ,Burn, Prolonged fever)

Na correction & ttt of the cause

c)Hypervolemic(Hypertonic saline, cushing , NaHCo3 therapy)

diuretics & fluid restriction 1st then Na correction & ttt of the cause

♦ Target level: 140 mEq/L except <u>in case of brain edema</u> → 160 mEq/L.

Normal Na^+ (140) x Normal body water = Current Na^+ x **Current body water**

Current body water = Normal Na^+ (140) x Normal body water / Current Na^+

♦ Water deficit = Normal body water - Current body water

♦ Methods of correction:

- Enteral: Distilled water او مايه عاديه → the same calculated volume.

لازم تتخلط مع الرايل فى الكيس او تتاخد فى ساعات لوحدها علشان تضمن انها بتتاخد

- IV (for NPO patients): Glucose 5%. → the same calculated volume except in recent neurological insult(distilled water in ryle or half normal saline)

  or Half normal saline → double the calculated volume.

- Don't forget to give the maintenance.

هام جدا جدا أهم سبب لفشل التصليح إن المحاليل مش بتتعلق أو اتعلقت محاليل غلط عشان كده لازم ترقم الأزايز وتعلقهم● كلهم بنفسك الصبح ع الحامل وتفهم التمريض إنها هتتوزع على الشيفت كله وتيجي آخر كل شيفت تلاقي الأزايز بتاعته خلصانة .

♦ Rate of correction: 0.5 - 1 mEq/hr or over 48 - 72 hours.
Avoid rapid correction as it may lead to brain edema.

♦ Assess Na^+ level every 8 hours during correction.

Contraindications of dormicum | **هام جدا** | <u>**محفوظة زي اسمك**</u>

♦ Renal impairment (not dialyzable) .

♦ Liver impairment → dormicum antidote: flumazenil (short acting).

♦ Old age.

♦ Neuro surgical patient (except in status epilepticus).

MENINGITIS

Diagnosis :

Fever +neck stiffness ±DCL or any patient feverish + DCL consider it .

Investigation:

- MRI with contrast محتاجه دكتور يشخص
- CSF (a)culture & cytology&b)chemistry (عينتين) (بأبره كبيره (صفرا)

  RBS ساعتين قبلها should be documented at the time of sampling علشان اقارنه

Infectious causes may be : bacterial , viral, fungal

Bacterial suspected if :

- WBC count (100-5000) mainly polymorphs.
- Glucose <40 mg/dl
- Protien > 100 mg/dl.

Viral suspected if :

- Glucose level : normal or slightly ↓ in specific viral infection.
- Protiens < 80 -100 can be slightly ↑ in specific viral infection.

Fungal suspected if : (Fungal =CSF as bacterial +MRI +source (most probably sinusitis may be with proptosis esp in immunocompromised and diabetic patients)

- WBCS ↑
- Glucose ↓
- Protien ↑ up to 250 mg/dl

CSF Drug Penetration :

Good penetration : see p(   ) + Acyclovir:10mg/kg IV /8hrs

Poor penetration : Tygacil, Targocid,Dalacin,Echinocandins,Amikacin

- Macrolides have good penetration but low concentration (limited use)
- Aminoglycosides(amikin &gentamycin): require high dose → not used alone or (injected directly in CSF as EVD or intrathecal).
- Meningitis doses are usually higher than ordinary doses, e.g, Meronem 2gm /8hr infusion not bolus على مدار 3 ساعات .

TB Meningitis 1-MRI suspect 2-CSF may be free 3-all cultures free 4-anti tuberculous دكتور يدي

Hospital aquired (nosocomial) meningitis	Community aquired meningitis
Vancomycin +	1-50 yrs.-----> Ceftriaxone + Vancomycin
Meronem/fortum / maxipime +	> 50 yrs or DM or immune compromised
Rimactane (optional)	Ceftriaxone + vancomycin + unasyn
Vancomycin: Ld: 20-25 mg/kg(max 3g /dose)	Vancomycin: same as before
MD: 15-20 mg/kg/dose q 8-12 h IV + 5-20 mg q	Ps : Continuous infusion of 60 mg /kg /day afte LD may
24 h intravent/ thec.	replace intra vent/thec. inj in case of inflamed meninges
Meronem / fortum/maxipime : 2g q 8h	Ceftriaxone : 2g q12 h. Unasyn :3g q 6 h
Rimactane: 600 mg q 24 h	

- **NB: ABC**

  If bacterial meningitis(community acquired) is suspected →

Give 1) Rociphen 2 gm /12hr +2) Vancomycin 1-1.5gm /8hr +3)unasyn 3gm / 6hr.

±We can add acyclovir (renal adjustment) for viral meningitis. او ياخد كله مع بعضه مع الABC

ISCHEMIC STROKE

Ischemic stroke (6)

1) Diagnosis

BE FAST

2) ABC (3)

A:
1-Bulbar يشرب قامي + pneumonia
2- GCS < 8
3- Ind. of intubation

B:
1- RR
2- Pattern of breathing
+Sat. Blood gases
± DD. Of hypoxia

C: Target
1-Ischemic stroke: 220/120 – if TPA 180/110
2- Hge stroke: 150 mmhg

3) Timeline (3)

1st 4.5:
TPA + precautions (6)

4.5 – 6:
Special imaging + expert opinion → ±TPA

6- 24:
Interventional radiology → Mechanical thrombectomy

4) Investigation of cause (3)

Old patient:
1. ECHO
2. Carotid duplex + CT carotid angio
3. Lipid profile
4. MRI e diffusion + MRA, MRV

Young patient:
As old pt. +
Hypercoagulable profile: Ptn C,S+ autoimmune profile

NB: If carotid duplex +ve :
Do CT carotid angio + vascular consultation

5) Care of bedridden (3 + NB)

1. **Physiotherapy**
2. **Psychotherapy**
3. **Communication**

NB:
- Care of bowel habits,
- Management of bedsores
- Assessment of DVT

Avoid:
a) Glucose in 1st 48 hrs.
b) Hypo/ hyperglycemia
c) Hyperthermia
d) convulsion

6) TTT (3 + NB)

1. **Antiplatelets:**
Single: Aspocid
Dual: Aspocid & Plavix
1. **Statin:** Ator (40-80 in case of stenosis)
2. **DVT prophylaxis:**
- Pneumatic cuff
- Aspocid
- Proper hydration

Anticoagulants if pneumatic cuff not available
Prophylactic: early in small stroke / delayed in moderate, massive stroke
Therapeutic: Oral / parental
NB: CL → follow/ 4Hrs., CT brain after 24- 48 hrs. ± decompression (عظمة+dura) → mannitol & Lasix قبلها + صورة

When do you suspect ischemic stroke or Hge?



NB:

- upper facial palsy →bell's palsy (LMNL affect upper part)
- Lower facial palsy→ask for upp. Limb numbness ,if present →suspect stroke
- Lateralization or +ve Babinski unilateral →suspect intracranial cause.

Initial Management → ABC

a) Airway

لازم تفهم اهل المريض من اول يوم انه ممكن يحتاج تنفس صناعى و tracheostomyولو ماكحش او gastrostomyولو مابيبلعش

♦a)indication of intubation :

1) Bulbar symptoms + pneumonia لو من غير pneumonia مش هعمل intubation عشان وارد يفك

2) GCS < 8 3)generalindication of intubation

♦b)oral intake : Gradual initiation of feeding with **water + witnessed** قاعد وساند راسه to avoid aspiration provided that conscious level is borderline & the patient swallow saliva. سرنجه رايل 5ml بس بالراحه و اتاكد انه مش بيجمع ف بقه

لو بيبلع الماء ويشرق فى الاخر ويكحها (consider semisolids→ better swallowed than liquids.زبادى) اول 48 ساعه خليه محاليل لحد ماترسى على Conscious level,

b) Breathing

♦ Ensure adequate ventilation (RR pattern of breathing) +satisfactory blood gases +DD of hypoxia if present .

c) Circulation لازم اكون عملت مقطعيه الاول علشان اقرر هعمل ايه

1) If ischemic stroke :

لو العيان ماشى على دوا ضغط لا تعطى فى ضغط اقل من :

♦ BP 220/120 is accepted in the 24 - 48 hours unless :

A) CHF , IHD , Eclampsia , dissecting aneurysm .

B) with TPA 180/110(which is administerated in first 4 hrs from the beginning of the complaint)

C) in IHD decrease BP 15%

♦ BP 180/110 is accepted in the next 48 hours.

♦ If SBP < 100 → start levophed infusion after assessment of volume status .

2) If hemorrhagic stroke :

☞ Target SBP in **Hemorrhagic stroke or intracranial Hge** → 150 mmHg if higher give IV AGENTS immediately ±one or more oral antihypertensives

- (ACE inhibitors :best to start with thiazide diuretics) .

Further Management

★ ***If detected in the 1st Day:***

a)1st 4.5 hrs TPA p(140)

(TPA ومايكونش بدأت وهو نايم وقت طويل ولو انت رايح الاشعه والوقت هيروح خد معاك كونسنت واحتياطاتك و***)***

- Do urgent ***CT or* MRI with diffusion (to exclude He)** → if ischemic stroke →

a) obtain a consent after b) consultation of neurology to give TPA

c) if not contraindicated

Contraindication of TPA: موجود فى وحدة السكته الدماغيه فى قسم 4 وهما شطار جدا

A) Absolute contraindication :

History 1)Prior intracranial Hge 2)known cerebral AV malformation

3)known cerebral neoplasm (primary or metastatic)

4)Ischemic stroke within 3 months 5)Intracranial or intra-spinal surgery<3 months

6)GIT malignancy or hge <3wks

Clinical 1)Severe uncontrolled HTN on Presentation (SBP>180 mmhg or DBP >110 mmhg)

2)Active bleeding or bleeding diathesis (plt <100 or INR >1.7 or whithin 24 hrs therapeutic anticoagulation if prophylactic you can inject or using oral anticoagulants(with few exclusion) 3)CT suggest irreversible damage (hypodense area)

B)Relative contraindication :

1) Age >80 years 2) H/O stroke >3 months in diabetic pt or large stroke alone

3)GIT hge > 3wks 4) pregnancy

5) Stroke with minor or improving symptoms

6)Large aneurysm (>10ml) unruptured & un treated

7) Hypoglycemia <50 8) current use of anticoagulant (prophylactic & NOAC) with their precautions

Dose :

0.9mg/kg maximum90mg over 60 mins

Precautions before administration :

1) Consent 2) neurology consultation 3)Check BP and RBS 4) Avil 5)soluocortif

6)Never give aspocid unless after 24 hr from TPA admininisration

- if TIA and resolved , no role for TPA

★4.5-6 hours :

after a) **special imaging** +b)**expert opinion** →TPA cauld be given لازم د.عصبيه شاطر

بلّغ بدري

★6-24 hrs(interventional radiology)± MRI e diffusion esp. in old age due to ↑ risk of bleeding

for **mechanical thrombectomy** if large vessel occluded(MCA & ICA)even after TPA

In old age & more than 6 hrs → MRI to exclude high risk of bleeding.

★ ***Assessment of conscious level every 4 hours. (TPA سواء اخد او لاء)***

- In case of sudden drop of conscious level → give mannitol (1 gm/kg) + lasix (40 mg)

→ Then urgent CT brain: if there is midline shift or hematoma → consider decompressive craniotomy or evacuation. [common in practice , هام جدا جدا]

بنتخانق عليها عشان نلحق العيان قبل ما يحصل conization .

NB: if the dominant hemisphere is spared →good chance +less depression و يعرف ياكل و يكلم

★ ***after stabilization Of (ABC)*** →***Search for the cause***

A) - Old patient:

1) lipid profile

2)Echo

3) carotid duplex or MRA Or MRV or CT angio

4)CT after 48 hours or MRI e diffusion if minimal deficit (MRI is better) .

- If carotid duplex is positive → do CT cerebral&carotid angiography or(MRA ,MRV بيتعملوا من غير صبغه على حسب قوة الجهاز)

+ vascular consultation for:

a)carotid endarterectomy or b) stenting or c) not for intervention .

B) - Young patient → as Old patient + autoimmune profile

protein C & S & anti-thrombin III after 3 months (↑ in acute phase).

★ ***PHYSIOTHERAPY + OUT OF BED +communication اهله وموبايل وتلفزيون***

+psychological support → مهمين جدا في العيانين دول .

NB: Avoid : 1)glucose in 1st 48hrs(hypoglycemic coma الا لو مضطر يعنى دخل فى)

2) hypo or hyperglycemia 3) hyperthermia 4)Convulsion

NB: poor prognosis ← dominant hemisphere لو الجلطة في

Medications *(3+NB)*

1) Statins → Ator 40-80 mg or Crestor 20- 40 mg. start with low intensity unless there is carotid stenosis (unless contraindicated) & if LDL >100 give ator 80mg

2) Aspocid (150 mg if with anticoagulant or 300 mg only for 5-7 days)

NB: No routine antiepileptic in stroke unless convulsions .

2) anti-coagulation.

For DVT prophylaxis :

1. A)Pneumatic cuff recommended over pharmacologic +
   b) aspocid and
   c)proper hydration .
   (if not available give LMWH but a-b-c- superior)
2. no difference between LMWH & heparin [after 24 hrs of TPA]

A) PROPHYLACTIC anti-coagulation can be started early in small stroke if pneumatic cuff is not available

PROPHYLACTIC anti-coagulation should be delayed (1-2days) in moderate to massive strokes due to high risk of hemorrhagic transformation except in patients with high risk for thrombosis such as previous DVT, malignancy & abdominal surgery.

- Heparin in moderate or massive stroke or clexane are equal

but heparin is a)short-acting with b) specific antidote in case of development of hemorrhagic infarction

, anticoagulant once started → assess conscious level every 4 hours esp with massive stroke.

- CT brain is indicated 24 & 72 hours after starting anti-coagulation (prophylactic or therapeutic to exclude development of hemorrhagic infarction or once there is deterioration in conscious level.

B) THERAPEUTIC anti-coagulation: In patients with indication for therapeutic anticoagulation;

e.g, recent pulmonary embolism, prosthetic valve, AF, DVT, MI ,Venous stroke.

a) **ORAL ANTICOAGULATION** In patients indicated for therapeutic anti-coagulation such as prosthetic valve, AF, DVT, etc → stop antiplatelet drugs & start **ORAL anticoagulation** as follows:

NI HSS (National Institute of Health Stroke Scale)	<8 mild Minute infarction	8-15 moderate Moderate infarction	≥ 16 severe Massive infarction(MCA)
	3 days	6 days after CT	12 days

b) **PARENTERAL THERAPEUTIC (as abridging until starting the oral anticoagulant** لازم بعد سؤال العصبيه وصاحب التخصص

anti-coagulation can be started after half the NI HSS durations for OAC according to the infarct size if highly indicated …filter in case of DVT

☞Minute 2 days ☞ Moderate 3-4 days ☞ Massive 6 days

متكتبش فى ورق العلاج إلا لو العيان هياخدها_

Single vs dual antiplatelets therapy in stroke patient :

Administration of aspocid is recommended in patient with acute ischemic stroke within 24 -48 hrs after onset .

- for those treated with TPA ,aspirin administration should be delayed 24 hrs
- berlique may be areasonable alternative in stroke patients who have contraindication to aspocid in acute phase , but in secondary prevention ,Plavix may be alternative if aspocid is contraindicated (allergy , severe gastritis)

_Single antiplatelets therapy unless :

a)immediately following aminor ischemic stroke(within 24 to 48 hr)

b)High risk for TIA or NIHSS≤3

(Give Dual Antiplatelets therapy for 21 days then single antiplatelets ,Plavix is preferred in IHD)

In dual antiplatelets:

Dose of Plavix: 300mg loading followed by 75mg /day (no loading in stroke)

Dose of aspocid :75mg/day

N.B. **Combined ASA & clopidogrel** →↑↑bleeding & no added benefit, if no indication.

ولذلك لا يستخدموا فى اول مره

.

Risk Factor for TIA (ABCD² score):

1)Age ≥60 → +1 2)BP≥140/90 → +1

3)clinical feature of TIA: a)unilateral weakness →+2

b)speech disturbance without weakness →+1

4)Duration of symptoms : a)<10 min→0 b)10-59 min→+1 c)≥60min→+2

5)H/O of DM→+1

- ***0-3→low risk***
- ***>3→High risk***

هامN.B: no therapeutic anti coagulant oral or i.v given with antiplatelets in stroke patient except cardic stent or recent MI .

N.B:

- **Moderate to severe MS with embolic event with sinus rhythm** → therapeutic anticoagulation for life

- **Venous ischemic cerebral infarction** →therapeutic anticoagulation even with hemorrhagic transformation (except if massive) ,heparin or LMWH 2 weeks then new oral anticoagulant or warfarin for 3 months تشخيصها محتاج دكتور

🗐 Brain stimulants have no role … بونبون بيتكتب علشان ماتروحش النيابه

Cerebrolysin is questionable & contraindicated in patients with:

a) renal impairment or b)convulsions (tienam, tavanic,maxipime.PK merz)

Somazina is contraindicated in patients with:

a) hemorrhagic stroke & b) intracerebral hemorrhage.

🗐 In **hemorrhagic stroke**, **brain contusion & intracranial hemorrhage** → manage bleeding as p() +

1-Assess conscious level / 4hr, 2- CT once deteriorated or after 24 hrs ,3-consult neurosurgery for a) evacuation or not, b)CT angio in (aneurysm &AV malformation)or not , c) further TTT or not (epanutine, decadrone ,…),

4-add procoagulant (kapron , diacinone , vit K)

-prophylactic anticoagulation can be started after 4 days

(provided stationary course :the same size , CT after 24hr and 72 hr) , meanwhile the patient should be maintained on pneumatic cuff.

While as therapeutic anti-coagulation can be started after at least 2 weeks up to 6 weeks (average 4 weeks). [coiling in Egypt , علشان الجراح الكفيف]

ACUTE KIDNEY INJURY(on admission ,in ICU)

KDIGO staging → **Kidney disease improving global outcomes**

	SERUM CREATININE CHANGES OVER 7 DAYS	or	URINE OUTPUT
Stage 1	1.5 × baseline OR increase by ≥0.3 mg/dL in 48 h	or	<0.5 mL/kg/h ≥6 h
Stage 2	2 × baseline	or	<0.5 mL/kg/h ≥12 h
Stage 3	3 × baseline	or	<0.3 mL/kg/h ≥24 h or anuria ≥12 h

لازم العيان يجيب بول اد مايدخل

Creatinine clearance is calculated by Cockroft-Gault equation: $\frac{(140-age)x\ body\ weight}{72\ x\ serum\ creatinne}$ x 0.85 if female
In morbid obese , calculate on adjusted body weight as heparin.
adjusted BW = ideal + 0.4(actual – ideal)
Ideal BW in male = height - 100 & Ideal BW in female = height – 105

هام جدا : العيان ال extreme of age لو creat normal(1-1.2) احسبله برضه ال crcl خصوصا فى الوزن القليل

☞ هام جدا Anuria for > 6 hours despite lasix infusion → creatinine clearance is considered below 10 whatever may be serum creatinine.& reassess if UOP improved

لو فتح يدخل تانى المعادله

High risk patients for AKI

1● عيان → chronic kidney disease(creat) & hepatic patients(bilirubin)& myopathy (myoglobin)& extreme of ages & hemolysis (Hb).

2● عمليات → vascular surgery(Hb,Ck), biliary surgery(bil) & massive debridement(CK)&renal surgery.

3●صبغة → urographine, massively crushed limb(myoglobin), bilirubin (obstructive jaundice),Hb in massive blood transfusion.

4● Sepsis & trauma.

5● Nephrotoxic Drugs(antibiotic او بنج)

Indications of dialysis **(Stable or not)** ضغط (**in renal patient**)

1-تبلغ التمريض 9 الصبح **2**-وجهز تحليل الفيروسات (300ج سموم / 450 ج رابع)

3-الماهوركر **4**-لو مفيش حد يغسل والعيان كويس يطلع الملك فهد ولو وحش وهيموت

بسبب انه مش هيغسل يطلع ويغسل

5 -صلح ال HCO3

6-صلح ال K لو عالى ابدأ ال antihyperkalemic بدرى (هام جدا جدا) و لو نزل عيده تان يلانه بيبقى shifted intracellular، ممكن بسهوله يعلى تاني الا لو جاب بول .

7-الاشاره زى ماالمرور قال لان الكبير اللى مر شايف اكتر من نايب فهد

8-لو عمل عمليه يوم الغسيل واخد دم يستحسن تغسله بعد العمليه (overload &K)

A)in hemodinamically stable + RENAL patients" (4+4)

بنبعت اشارة غسيل علشان نعمل اللي احنا عايزينه مش اللي هما عايزينه

Clinical (Major Systems)(4items)	Laboratory (4items)
1. CNS: DCL (uremic encephalopathy). 2. CVS: Pericarditis (pericardial rub). 3. Respiratory: Pulmonary edema. 4. GIT: Persistent vomiting.	1. pH < 7.1 or HCO_3 < 10 ماشي علي HCO3 2. Refractory hyperkalemia > 6.5 ماشي علي Anti صلح الاثنين دول لحد ما العيان يغسل 3. Creatinine > 10 or rising by > 1 / day (ignore in critical patients). 4. Urea > 200

B) Dialysis in unstable renal patients

★ Don't rush to dialysis in unstable patients unless there is a profound life-threatening indication:

1◆ Severe acidosis →not responding to bicarb .

2◆ Resistant hyperkalemia not responding to correction & after recheck

3◆ Pulmonary edema.

4◆ DCL due to uremia

ليه بنصبر ؟؟يمكن ضغطه يتحسن قبل الغسيل لان السحب هيموت العيان

★1- Obtain a mortality consent before dialysis

★2- Increase the vasopressor dose till SBP 160.

★3- مكنة 1-بتسحب ببطء وتكون2- واقف و وهو بيتسحب ع المكنة

زي 1-اول غسله للtracheostomy و2-غيار العيال الصغيره و3-اول اكل عيان ال stroke 4-chest tube insertion

★4- Single session then reassess.

لازم **يوميا** حد كبير يشوف العيان على بعضه هيتحمل الغسيل ولا لاء

❁Continous venous-veno heamodialysis :a dialysis over 24-48 hrs more suitable for unstable pt فى مستشفيات معينة

NB:

- Maalox containing Aluminium which has cumulative effect in renal pt.
- Anemia may result in a child from scalp hematoma
- Fix HCO3 in ttt if pH<7.2
- Lasix → interstitial nephritis + ↑ creat.
- If renal patient with severe LL edema (severely congested) give Lasix.

لو السونار بيّن.Atrophic kid فى عيان بيغسل و مركب ماهوركر يبقي من الإحسان نلزق بلاستر بالطول على ذراع العيان و ممنوع سحب عينات لغاية ما يركب A-V fistula

Mahurker in renal dialysis AKI & U/S show atrophic kidney injury

من الاحسان اني 1- الزق بلاستر على دراع من الاتنين و اكتب ممنوع سحب المعامل و 2- ابعت للاوعية عشان العملية و 3- لو الأوردة مش واضحة أو العيان obese اعمل upper limb duplex

عشان اجنبه تركيب 2-3 ماهوركر و يحصل stenosis upper limb duplex

4-ابعت مع الاهل عشان يعملوا قرار الغسيل لان AV fistula بتاخد 3 اسابيع على ما تشتغل ...

5-Types of mahurker a) double lumen

b)triple lumen: 2 for dialysis & 1 for inotropes during dialysis

One Dilator بتدكك ب if there is increase risk of bleeding or coagulopathy

Permicath it is a tunneled longer mahurker

*duration up to 6-12 months *less incidence of infection than mahurker.

*superior in cardiac pt than AV fistula *uses: heamodialysis, chemotherapy,plasmapharesis

PIC(peripheral inserted central):

Inserted through antecubital vein to reach the heart P( )

*Duration up to 3 months

*Used in cases of prolonged canulation *site checked by x-ray or U/S

Portacath P ( )

There is a small reservior felt under the skin

Used esp. in pts receiving chemotherapy

Management of AKI



Pre-renal

Exclude pre-renal causes as shock

❶ **Ensure adequate volume status:**

1. Static measure → CVP.
   Target CVP: 12 cmH_2O in spontaneously breathing patients & 15 cmH_2O in ventilated ones
   ادي محاليل ما دام مش hypoxic ولا cardiac بس آخرك 2000 +ve حتى لو CVP موصلتش للأرقام دي .
2. Dynamic measures → Cardiometry, Echo & PPV.
3. Clinical → ميزان خصوصا العيانين اللي في بيتهم

❷ **Target MAP** > 65 mmHg (> 85 mmHg if HTN).
In case of high intra-abdominal pressure more than 20 cmH_2O → target MAP will be > 85 mmHg
لو بطن العيان مش tense ماتقيسوش
+ consider management of high IAP P (179).

❸ **Perfusion:**

1. Lactate　　　2. Capillary refill
3. Central venous SO_2 >65%
   If less → ↑↑ Hb > 9 .
   If still low → dobutamine infusion لو ضغطه يسمح
4. CO_2 gap (central venous CO_2 - arterial CO_2):
   If > 6 mmHg → bad sign.

Post-renal

Exclude post-renal causes

❶ Check urinary catheter & urine bag for obstruction.
سلك القسطرة أو غيرها وسلك كيس جمع البول ...
لو في conduit اتأكد إنه شغال (نائب المسالك).

❷ Perform abdominal ultrasound to detect backpressure changes (exclude stone).

❸ Palpate the bladder (even if no catheter obstruction) especially after TURP or trauma as urethral injury may cause a false track → Ultrasound will show distended bladder with no renal backpressure changes → managed by suprapubic cystocatheter.



Management

(3 ورقات: ورقة balance وورقة العلاج وورقة المعامل)

ورقة ال Balance

❶ Check balance/4 hrs & restrict fluids to avoid congestion ± bolus.

❷ Stop potassium supplementation +Mg & correct cautiously if hypokalemic with symptoms (arrhythmia).

ورقة العلاج

❸ **Daily** calculation & documentation of **creatinine clearance, stability of drugs** (يتسجل في ورق العلاج) & adjust drugs accordingly.

N.B: Anuria despite lasix infusion for 6 hrs. = creatinine clearance < 10 (لو فتح نعيد تاني)

N.B: In septic shock with AKI → give beta lacatam antibiotics in normal doses for 48 hrs the re-adjust.

❹ Stop nephrotoxic drugs unless lifesaving → e.g, antibiotic on culture.

❺ Diuretics **±Albumin**: 20-40 mg shots over 5 minutes or 60-120 mg over 20 minutes or 160-200 mg over 40 minutes if pt recovered stop Lasix (**injurious may ↑creat) ± Infusion after bolus 5-40 mg/hr.**

- Start with high doses if the patient is already on diuretics (by history).

-(pretest) Patients who have partial but inadequate diuresis with bolus therapy should be treated with continuous infusion.

لو عيان على ليفو ولازكس infusion وبيجيب بول قليل ←يكمل عليه مادام هيجنبه hyperkalemia & congestion وبالتالي هيجنبه الغسيل لحد ما يبقى stable .

- Patients who have no response to maximum dose of bolus therapy should not be treated by continuous infusion.

- Lasix infusion even in low dose is more effective than shots, e.g generalized anasarca.

❻ **Albumin** in anuric or oliguric patients with diuretics with **hypoalbuminemia** < 2.5 gm/dL. مهمة جدا

❼ Dialysis: (stable/ unstable) (see indications page (174)

❽ Work up of kidney in case of known CKD or **persistently high creatinine** level (most probably missed chronic renal disease)P(181).

Renal protection against contrast dye
1. Stop NSAIDs 24 hours before dye administration. 2. If 1) fluid responder,2) fasting or 3) fluid status can't be assessed with no contraindication for fluids (e.g, outpatient): give normal saline 1 ml/kg/hr for 6 hours before & 6 hours after. 3.No any drug has role in prevention of nephrotoxicity not even $NaHCO_3$. 4. stop metformin

Hyperkalemia

☞ Serum K^+ > 5.5 mEq/L.

☞ **Clinical picture:**

1. Muscle weakness
2. ECG changes:a) hyperacute T (> 2 LS in chest leads & 1 LS in limb leads) in all leads ,b) prolonged PR & c) wide QRS d) Finally cardiac arrest in diastole.

☞ **Anti-hyperkalemic measures طرق 4(على الترولي)**

A: alkalosis (respiratory &HCO3) B:potassium stoppage
C:calcium & chelation (Resinokaten) D:diuretics (forced diuresis) ± dialysis
E:check ECG changes F:Farcolin G:glucose / insulin

1. Stop potassium intake.
2. Protect the heart: 3 ampoules of calcium gluconate or 1 ampoule of calcium chloride except if patient on lanoxin (send lanoxin level fisrt)
3. ↑ Intracellular shift of potassium: (rebound if no excretion in urine)
   - a ♦ β_2 agonist: farcolin (salbutamol)except in arrhythmia& IHD.
   - b ♦ Alkalosis:1) metabolic ($NaHCO_3$) &2) respiratory if ventilated (hyperventilation).
     N.B, For every 0.1 decrease in pH → K increases by 0.8.
     Target: alkalotic PH
   - c ♦ Glucose-insulin: 1-2 units of insulin added to 5 gm glucose (insulin بس ، لو السكر عالي)
     = 10 - 20 IU to 200 ml of glucose 25% **bolus** every 6 hours
     جري المحلول ع الآخر عشان يجيب نتيجة وقيس السكر قبل وبعد
4. ↑ Potassium loss:
   - a)Kidney: Lasix shots up to infusion as before (forced diuresis ندى محاليل وتزق لازكس) provided بيجيب بول.
   - مكيالb-GIT: Oral potassium chelating agents (sorbisterit)(resinokaten) هام→ ↓K^+ absorption from GIT → very effective 4hrs. SE: gastritis
   - c♦ Dialysis if K^+ > 7 + ECG changes in renal patient either stable or not P(221)

- لو اديت الحاجات دى بس العيان ماجبش بول كويس حتى لو البوتاسيوم بقى كويس عيده بعدها تانى لانه هيعلى تانى ولو مش عارف تعمل بوتاسيوم او فى اى تأخير و العيان اقرب للغسيل اغسله احسن مايموت علشان تأخير فى معامل بس ده مايمنعش انك تنزل بنفسك وتفرق علشان معاملك تطلع ده فى اسوء الظروف فقط
- اى لخبطه فى ضربات القلب فى العيان ده لازم تاخدها بجديه وتامه وتاخد اكشن ضرورى لانه بيبقى السبب بوتاسيوم
- Arrhythmias in hyperlalemia (extrasystoles) →indication for dialysis .
- Lasix for long periods →interstitial nephritis

Potassium Replacement Therapy(IV&Oral)

➩Causes of hypokalemia e.g. 1-high output fistula 2- TPN 3- diuretics 4- refeeding $ 5-dialysis

- Potassium level: Intracellular: 135 … Extracellular: 3.5-5.5

Potassium replacement 1- IV form 2- oral form

IV form :- Potassium ampoule = 10 mEq dialy requirement 1 meq/kg /day.

- 5 ampoules K + 1gm Mg/50 ml saline → Rate 15-20 ml/hr "central line CVP or external"
- Maximum dose → 24 ampoules in 24 hours.

العيان ياما وصل4.5 او وصل 24 امبول و لازم تعيد بعد كل 10 امبولات

- Hypomagnesemia is a common cause of hypokalemia

1 gm MgSO4 to every 5 amp. KCL ← لوماغنسيوم واطي او مطلعش حط .

1- يعني 24 K ampoules with rate 20ml/hr يخلصوا في 12 ساعة

2-تصليحتين 10 amp = 5 hr بعدين نسحب labs

3-labs معاك 12 ساعة تاني تكون عملت

-Maximum rate 40ml/hr in a)life threatening eg. arrest or pre-arrest b)DKA if <3.3

- Maximum rate of peripheral potassium infusion is 8 mEq/hr to avoid thrombophlebitis+large vein + diluted.

- Oral forms: 1 tab = 8 mEq ... 25 ml syrup = 10 mEq → Dose 45 ml(18meq)/ 8 hrs.±موز

Not in renal pt

How to correct+دوّر على السبب a)adult ➩ 1-acute 2- chronic 3- renal

b) pediatrics: 1/3 BW x deficit(4.5-actual) if chronic أعيد التصليحة

1-Acute(أول مرة ينزل (قراية واحدة)

a)أدور على السبب و أصلحه(eg. with alkalosis b)maitanence أتأكد ان في c)التصليحة

5 amp K + 1gm Mg تصليحة و أعيد if K< 4.5 another correction ,K>4.5 ما تعيدش التصليحة

2- Chronic hypokalemia is most probably due to intracellular defect(135)

a)السبب b)maintanence أتأكد إن في c)التصليحة

→ give 10-15 ampoules then reassess → If minimal rise → give another 10 ampoules…

If > 4.5 or reach 24 amp /day → stop K^+ infusion.

3- Hypokalemia in renal patients: cautious correction "2 amp. then reassess" 2×2

target: 3.5 mEq/L.

NBAvoid: 3 ادويه مع 3 امراض

a) oral potassium b) aspocid except protect & c)NAC

in1) gastritis, 2)hematemesis & 3) peptic ulcer.

Hypocalcemia

- ↓ 1 gm albumin belw 4 →↓ ca 0.8 eg ca 8 & albumin 2 so corrected Ca = 9.6
- Corrected Ca =actual +0.8(4-actual)

- Normal serum Ca :10 mg/dl =100mg/L (5mg / dl ionized=50mg/L)
- EqW =Mw/valency = 40/2=20 ,so dl(100)×10/Eq(20) weight =10×10/20=5mEq/L (2.5mg/dl ionized)
- In blood gases ,Mw =40 ,so(dl(100)×10/Mw(40))=2.5mmol/L (1.25mmol/L ionized)

- Ca correction accorging to ionized calcium level :

• 0.85-0.95 mmol/L	2gm ca chloride =2 amp.	Recheak after 4 hours
• 0.75-0.85 mmol/L	3 gm ca chloride	Recheak after 4 hours
• 0.65-0.75 mmol/L	4 gm ca chloride	Recheak after 4 hours
• < 0.65 mmol/L	5 gm ca chloride	Recheak after 4 hours

- Ca gluconate max. infusion rate :200mg/min in adults , 100mg/min in pediatrics .
- Ca choloride max. infusion rate : in severe cases 4gm over 4 hrs.(1 amp./hr)
  In mild cases 1-2gm over 2hrs.

- If symptomatic(carpopedal spasm, tetany,seizures,prolonged QT) →Iv calcium every 4-6 hrs&measure Mg and K→aggressive correction.
- If Asymptomatic and can tolerate oral feeding→oral Ca and vit D and repeat after 1 week.
- Total Ca = 10mg/dl , 5meq/L , 2.5 mmol/L
- Ionized Ca= 5 mmol/L, 2.5 mmol/L ,1.25mmol/L

Hypercalcemia ذكٍر**once**

1-PTH 2-Calcitonin 3-Vit.D

3 Sites :Kidney, GIT ,Bone

☞clinical picture: of the 3 sites

☞Treatment

1-ABC + ttt of the cause eg. ↑ PTH , malgnincy

2-Forced diuresis

3-consider calcitonin & biphosphant if (PO4 >13 & Cr Cl.<30)

لما تركب ماهوركر لعيان End-stage renal disease

➢ نظافة كتيييير "disinfection".

(guidelines)➢ Site: 1)Rt IJV > 2)Femoral(inguinal hygiene (مش عندنا عشان) > 3)Lt IJV > 4)Subclavian.

لو كله مقفول ← intrahepatic catheter (interventional radiology)

➢ شكة واحدة في subclavian vein بتعمل 50% stenosis فارحم العيان عشان يعمل وصلة من غير ما دراعه يورم.

➢ تتلف في شاش ولا تستعمل إلا في الغسيل(flush with heparin saline)

Types of mahurker 1- double lumen 2- triple lumen.)

➢ لو السونار مطلع grade III nephropathy قول للعيان 1-يعمل قرار في أسرع وقت عشان يعمل الوصلة وميتأخرش لأنها أصلا بتشتغل بعد شهر وخلال الشهر ده هيكون اتشك في كل حتة في جسمه (احسان)

مبقاش نافع يعمل وصلة خلاص و نجيب 2) duplex± 3)vascular

➢ممنوع تغيرها على guidewire هتجيب massive air embolism ، لو أجبرت دخله في الـ rubber بتاع الغطا

➢تحط بلاستر على دراع العيان ممنوع يسحب منه معامل او تقيس ضغط

ال fistula بتركب cephalic with radial art. or cubital (superficilization +natural or synthetic graft)

لو عيان ال coagulation profile مش حلو دخل dilator واحد كفايه وإلا هينزف جامد

Intra-abdominal pressure تحس بطنه لو مريحه ماتقشش

☜ ☜ حط ايدك علي بطن العيان لو laxخلاص لكن لو tense نقيسه (ازاي؟) والعيان supine ... احقن 25 سم ملح في قسطرة البول ووصلها ب جهاز وريد ومسطرة cvp.

☞ Intra-abdominal pressure is important because renal perfusion pressure = MAP – (2 X IAP).

☞ Suspect high IAP in the following conditions:

1- Major trauma/ burn
2- Abdominal collection
3- Tense ascites
4- Massive transfusion
5- Abdominal surgery with tight closure
6 - Liver tear closed with packs >>edema+نز

☞ In case of a) in adult high IAP > 20 cmH_2O, a higher MAP is desirable (80-85 mmHg)
b)in pediatrice high IAP >15cmH_2O
(max 25 cm ,min 3 cm.) volume 1ml/kg فى الاطفال احقن

How to reduce. لو عالي عملت ايه

Consider intervention to reduce IAP especially if causing AKI (oliguria or acidosis):

1-NPO 2- Tapping in case of ascites 3- Ryle (open) 4- Rectal tube
5- Surgery (pogota, fasciotomy (in burn **H** shape) or skin closure only يشبط جلد بس)

Rhabdomyolysis

♦ **Diagnosis:**

- Rise of CK level 5 to 10 times above normal value for follow up.
- CK > 5000 IU/L increases the risk of AKI.

♦ **Common Causes:**

1 - Direct muscle trauma, 2- burn, 3- electrocution, 4- seizures, 5- hyperthermia, 6-hypothermia 7- reperfusion injury.

In such conditions, keep your eyes on UOP.... زي الصبغات(endogenous & exogenous) → Myoglobin , Hemoglobin .

♦ **Treatment if CK >5000:**

• Normal saline or ringer lactate infusion at 3-5 ml/kg/hr till CK level decreases (provided there is no contraindication for fluids: hypoxic, cardiac, anuric)

Keep your eyes on a) oxygenation (PF ratio), b) contractility & c) UOP ...
If affected → ↓fluids.

• Target UOP > 100 ml/hr.

• If normo or hypervolemic → mannitol 12.5 gm/ 6 hrs or lasix can be given.

• If acidotic → give half normal saline + 50 mEq $NaHCO_3$ to every liter at a rate of 125 ml/hr (alkanaization of urine)
till urinary pH becomes > 6.5 or serum pH becomes > 7.5

Acute Limb Ischemia :

In case of :a)embolectomy
b)bypass
c)crushed limb
d)aortic clamp
e)ligation of artery

1- Pulse
2- Colour changes, temperature ضهر ايدي و اطلع ل فوق
3- AKI
4- Check :↑CK,↑CKMB,HCO3,K,Acidosis ±bleeding if there is oozing p() (Hb & INR)
5- Infected stump & vaccum , consider ambutation if life threatening بنغير عليه بنفسنا كل 8 ساعات و مكتوب في ورقة العلاج .
6- Consider rhabdomyolysis

هام جدا :العيان اهم من رجله مش بنتخانق الا لو :

a)septic (life threatening)و هما قالوا نصبر

b)If not ambulant(limited physical activity) or congestive heart failure →
ambutation is more preferred than revascularization لانه كده مش بيتحرك

*infected stump يتغير عليها بنفسك كل 8 ساعات ويتكتب فى جدول وتمضى عليه لو الرجل بتتحرك يبقى مش dead

CHRONIC KIDNEY DISEASE
(as comorbidity or AKI not resolving)

Investigations

الهدف انك تعملها قبل ال consultant فى الخاص علشان توفر فلوس على المريض بدل مايزوره مرتين

في الـ private كل consultation بـ 500 جنية

1. **Ultrasound** → to detect the grade of nephropathy.
2. **Albumin/Creatinine ratio** → presence of albumin (thousands) in urine indicates renal disease → treated by ACEI, ARBs→Cardiac, DM or CCB (isoptin &diltiazem).
3. **Parathormone level** → ↑↑ in case of hypocalcemia (secondary hyper-parathyroidism).
4. **Iron profile.**
5. **Electrolytes:** K^+, Na^+, Ca^{+2}, PO_4 & Mg^{+2}.
6. **Urine analysis:** ↑ casts in ATN, ↑ WBCs in interstitial nephritis, ↑ RBCs in vasculitis.
7. **Echo every 6 months** → to detect cardiomyopathy.routine workup.

Management

1. **Anemia (Hb < 10 gm/dl).** **TLC ↑after bood transfusion .**

   In case of ↓or normal iron level → give eprex (erythropoietin) + ferosac (iron).

   In case of high iron level or blood transfusion → give eprex only.

   -Eprex in CKD not on dialysis →once weekly ,avoided in presistant HTN.

   -Eprex in CKD on dialysis →3 times weekly.

   -Iron better to be avoided in infection .(inotropes or severe sepsis)

2. **Hypocalcemia:** (calculate the corrected ca)

   a)In case ↓ Ca with normal PO_4 → give 1-calcimate

   (maximum 500mg/D elementary ca include feeding)+ 2-one alpha(vitamin D).

   c) In case ↓ Ca with high PO_4 → give calcimate only

   (500 mg /8 hrs).

   ☞ For each ↓ 1 gm of albumin below 4 gm/dl → calcium decreases by 0.8

   Eg: Albumin 2 , calcium 7 ,so corrected calcium =(4-2)x0.8+7=1.6+7=8.6

3. **Statins**

(provided no CI: 1-active liver disease ,2- rhabdomyolysis,3-lactating or4- pregnant female):

>50ys →give statins

-<50 ys→don't give statins unless has one or more of the following (known coronary disease , prior ischemic stroke,DM, hyperlipidemia & PVD)

$✋ **Nephrotoxic drugs commonly used in ICU:**

- Amikacin - Amphotericin B - Vancomycin esp with tazocin
- NSAIDs - Colistin - ACEI
- Cerebrolysin ?? convulsion - Aldactone - Dye

Cerebrolysin & aldactone: should be stopped in case of creatinine > 2.5 .

ACEIs & ARBs if indicated (DM &IHD)**:** Follow up creatinine → stop if rising > 50% of baseline

☞ In case of generalized edema →

give diuretics whatever **its impact on kidney function صدق العليل**

☞1- AV fistula موجوده او بتحضر لعملها or 2- after MRM or 3- upp. Limb DVT →

الزق بلاستر بطول دراع العيان إنه ممنوع قياس الضغط أو تركيب كانيولات ع الناحية دي

Medications commonly associated with acute tubular necrosis:

• Aminoglycosides. • NSAIDs. • ACEIs & ARBs.
• Amphotericin • Others: Iodinated contrast

Medications requiring dose adjustment or cessation in AKI

• **Analgesics**: morphine, pethidine, gabapentin, pregabalin.

• **Digoxin** • **LMWH** (clexane)

•**New oral anti-coagulants**

• **Antifungals**: fluconazole.

• **Antibiotics** (most of them).

•**Oral hypoglycemic drugs**: sulfonylureas & metformin.

• **Antivirals**: acyclovir.

• **Lithium**

Expectyl: not in renal disease

Antiepileptics: lamotrigine

•.**Don't give dormicium** لو اضطريت نص ف نص:

in a) renal & b)hepatic & c)neuro & d) extreme old age

NB:ultrafilteration (average 750 ml /hr)(10-13 ml /kg /hr)

لو قولت 6 لتر يبقى هيغسل على 8 ساعات

DIABETIC KETO-ACIDOSIS

♦ Usually: type 1 DM, missed dose, eats a lot.

Risk factors → Trauma - Surgery - Infection - Pregnancy.(the same risk factors of endocinal emaegency (hypo))

Clinical picture | **من فوق لتحت**

- **CNS** → drowsy or comatose.
- **CVS** → tachycardic with borderline blood pressure.
- **Respiratory** → tachypnic with acetone odor (Kussmaul's breathing).
- **GIT** → vomiting with abdominal colic (acute abdomen).
- **Renal** → polyurea.

Diagnosis

- **RBS** > 200 mg/dl
- **Acetone in urine : positive more than (+).**
- In some cases it is **temporarily** negative then becomes positive.
  - Acetoacetic acid appears late & disappears late (detectable in urine & blood).
  عيان End-stage renal disease لو مش بيجيب بول يتعمل فى الدم لن لو بيجيب نعمله فى البول
  - β-hydroxybutyric acid appears early (detectable in blood only), وغير موجود في مصر
- **ABG** → metabolic acidosis with **high anion gap ,Corrected AG ,gab gab ratio (HCO3<15 , PH <7.3)**

♦ **Severe DKA** (**ICU admission**) →

1- CNS: GCS < 12,
2 -CVS: BP < 90 & HR >100 ,
3-ABG: pH < 7 , HCO_3 < 5 , Anion gap >12 .

Endocrinal Emergency

1-Sheehan $ 2-Thyroid storm or hypothyroid coma(myxedema

3-DKA , Hyperosmolar hyperglycemia ,severe sepsis

4-Addisonian crisis p ( ) 5- pheochromocytoma

Management **8 items =6 items +2N.B (resolution امتى اقول خف , when to fix insulin)**

1) **ABC**

2) **Fluids** **Main ttt (volume- mechanism – type)**

A)Volume(in wide bore –separate- الازايز مترقمه أهم أسباب الفشل)	***B)Mechanism of action:***
A➢ Adults: 50-100 ml/kg normal saline: 1000 ml → in first hour; 500 ml/hr → for next 4 hours (2000) normal or half saline±glu: 250 ml/hr → for next 8 hours(2000); 150 ml/hr → for next 8 hours. Guided by fluid status & UOP.(1500) اخر اليوم Net balance +1500ml in normal adult patient. Be cautious in: 1-elderly ,2- hepatic & 3-cardiac 4-hypoxic 5- renal patients. **B➢** Pediatrics: Give 20 ml/kg of normal saline as a bolus. Give another bolus in shocked patients.start inslin after fluid bolus . ➢ Then give double the maintenance. ➢ Start G5% when RBS 250-300 mg/dl ➢ Resolution:PH>7.3 OR HCO3>15 ➢ Take care about brain edema.v.imp in pediaterics	1. Correction of dehydration & improvement of perfusion. 2. Dilution of anti-insulin hormones. 3. ↑ sensitivity of insulin receptors.

c)Type (N.saline 154/L Na, half normal 77/L Na glucose 0/L)

after initial resuscitation,According to corrected Na^+ level (بعد 5 ساعات حوالي 3 لتر)

→ Serum Na^+ + (1.6 x $\frac{RBS - 100}{100}$).

As each 100 mg/dl of blood glucose above 100 leads to a decrease of Na^+ level by 1.6.

e.g, serum Na^+: 130, RBS: 500 →

$$\text{Corrected } Na^+ = 130 + (1.6 \times \frac{500 - 100}{100}) = 130 + 6.4 = 136$$

☞ This is because hyperglycemia draws water from the intracellular space & creates a dilutional effect on plasma Na^+.

➢ If corrected Na^+ level is high > 140 → give half normal saline (if not available add 250 ml of glucose 5% or distilled water + 250 ml saline).

➢ If normal or low ≤ 140 : give normal saline.

➢ When RBS decreases below 250 mg/dl →

1-give 1-2 ml/kg/hr glucose (5% or 10% or 25% according to glucose level)

+ 2- normal saline

+3- half dose of insulin.

☞ The volume of infused glucose should be subtracted from the deficit.

3) Insulin

♦ Give a bolus of 0.1 unit/kg of regular insulin IV then 0.1 unit/kg/hr unless patient hypokalemic (correct first on max rate).

♦ Check RBS hourly.

♦ The blood glucose level should decrease by 70-100 mg/dl per hour.

If > 100 → ↓ insulin infusion to ½ dose (0.05 unit/kg/hr).

♦ DKA in **cardiac & renal patient(**Resistant DKA due to restriction of fluids) → double the dose of insulin.

♦ في مصر → Rate of infusion = $\frac{RBS}{100}$ → units/hr.± bolus بنفس الرقم

♦ In hypoperfused patients → peripheral RBS is less than central RBS by about 30-50 mg/dL

لو عيان على inotropesوسكره واطى و ايده ساقعه قيسه من ال CVL

NB ⇨mixtard يوقف ⇨.لو العيان كان ماشي علي Lantos continue even with insulin infusion

4) Potassium

♦ If > 5.5 → **no** replacement ... If 3.5-5.5→ give **20** mEq/hr ...

If < 3.5 → give **40** mEq/hr.

هام جدا♦ If < 3.3 → hold insulin & correct hypokalemia first with maximum rate 40 mEq/hr.

♦ Serum K^+ & ABG should be checked every 4 hours (as DCL, Hge,UOP in AKI ,ARDS).

5) Bicarbonate

♦ Given only if pH < 7 ... إلا لو كنت في الطل اديله أمبولين وحصل خير

6) treatment of precipitating factor

e.g, control of infection: a)medical(antibiotics &culture)

b) surgical → e.g, debridement of diabetic foot

c)chronic devices.

☞ DKA + DCL or proptosis → suspect Mucormycosis → diagnosed by CT brain TTT p (180)

☞ Always suspect UTI especially in females and diabetic patients.

DKA in cardiac & renal patients

- Give fluids according to 1) lung ultrasound & 2) fluid responsiveness → Static (CVP) & dynamic (Cardiometry, Echo. LIDCO & pulse pressure variation).

Check CVP after each 200 ml.

هام ➢ Double the dose of insulin.

- renal patient →a) **dialysis if indicated→ ..non responder لو قاطع بعد ما يبقى.-**

  b) لو بيجيب بول محاليله عادى

- cardiac patient → cautious fluids administration ± lasix (if become congested).
- Expected to be resistant because treatment of DKA depends mainly on fluids & not insulin.

☞ ***Resolution of DKA امتى بنقول ان العيان فك?***

- ♦ $HCO_3 > 18$ for ≥ 2 readings
- ♦PH>7.3 for ≥2 readings .
- ♦ Acetone-free (أسيتون قديم من الأول) من القسطرة نفسها مش من كيس جمع البول

  (Don't relay on urinary acetone as it disappears late.)

When to Shift to fixed insulin doses? 5 شروط قبل ما أثبت

After 1- adequate 2- oral intake (3-stop IV glucose) 4- not on inotropic support

5 - اكل مرضى سكر

- Transition from IV to SC : 1) type 1 DM ,2) type 2 on insulin or oral hypoglycemic ما ينفعش 3) if the rate >0.5ml\hr at the ICU in the last 6hr and 4) HBA1c > 10. (SC not oral hypoglycemic)

80% of daily requirement of regular insulin ←تحسب اخد اد ايه اخر 24 ساعه daily requirment

a) معكر **Mixtard**: 2/3 in the morning & 1/3 at night ± oral hypoglycemic in type 2

Eg:daily requirement 80 units →80% of 80 units =60 units →

40 units at morning ,20 units at night

Or b) القلم الغالي **Lantos** single dose at night(40%of total daily dose)

+ 3 doses of **Actrapid المائي** before meals. شكات كتير

في أوروبا والدول المتقدمة فقط عشان الـ calories بتكون محسوبة في كل وجبة ... في مصر مفيش 4 شكات

الحل التاني 80% يتقسموا تلتين و تلت ولو قراية قبل الوجبة عالية بنعدل ال previous dose

✧if accidentally discovered DM→

Mixtard 0.5 - 0.75 unit/kg/day ± oral hypoglycemic(type 2).

☞ Lantos can be continued in DKA during insulin infusion

☞ Mixtard is taken after resolution of DKA. بس يبدأه من تاني يوم الصبح

معكر Mixtard: Short-acting / intermediate -acting (30/70 ml)

Lantos: Long-acting

شفاف Actrapid: Short-acting

Hyperglycemic hyperosmolar non-ketotic coma

- Occurs in old patients without ketoacidosis.
- Usually in type 2 DM.
- Ketoacidosis may occur very late (starvation ketosis) but usually mild (less than ++).
- ttt of predisposing factors
- Diagnosis:
  1. Hypovolemia
  2. Marked hyperglycemia > 500 mg/dl
  3. Osmolarity > 320 mosm/kg
  4. No significant ketonuria or acidosis (mild or no ketoacidosis).
- Management: 1-ABC 2- fluids 3-Insulin 4-Potassium + 5-predisposing factors 6- ✕ + 2 NB

- **Fluids**

  1.Volume:100-200 ml/kg فاضي جدا

  The target is to achieve positive net balance around 3L by the 6th hour, guided by fluid status & UOP (the usual deficit is 9 - 12 liters).

  2. Type: normal saline.

  If RBS < 250 use glucose 5 %, 10% or 25% according to blood glucose level.

<u>Role of Glucose in hyperosmolar</u>.:if Glu.>500 there is ↑in brain Glu. Level with decrease of blood Glu. Level this leads to brain edema & coma

3. How to adjust Fluid therapy :

Check osmolarity immediately on admission & 6 hrs later.

Plasma Osmolarity = (Na x 2) + (Glucose/18) + (BUN/2.8)

a) If falling at a rate > 8 mosm/L → consider ↓↓ rate of IV fluids.
b) 8-3 optimum
c) If Na increases or osmolarity increases or decreases < 3 mosm/L →

check the balance:

- If inadequate (positive less tha 3L) → ↑↑ rate of saline infusion.
- If adequate → switch to half normal saline.

- **Insulin**: Don't start insulin unless blood glucose dosen't fall with fluid therapy → start insulin at a dose of 0.05 unit/kg/hr.
- **Potassium** infusion as in DKA.

BG (mg/dL)	Pre-meal: Sensitive (BMI <25 or <50 units/d)	Pre-meal: Average (BMI 25-30 or 50-90 units/d)	Pre-meal: Resistant (BMI >30 or >90 units/d)	Bedtime and 2 a.m.
131-150	0 units	1 unit	2 units	0 units
151-200	1 unit	2 units	3 units	0 units
201-250	2 units	4 units	6 units	1 unit
251-300	3 units	6 units	9 units	2 units
301-350	4 units	8 units	12 units	3 units
351-400	5 units	10 units	15 units	3 units
>400	6 units	12 units	18 units	3 units

Glucose mg/dl (mmol/l)	Insulins rates (ml/h)		
	Reduced rate	Standard rate	Increased rate
	Treated previously with • diet, • oral antidiabetic therapy or • Insulin treatment with <24 daily IU	a standard rate for most of diabetic patients	for patients treated with insulin therapy >100 daily IU.
<144 mg/dl (<8 mmol/l)	0	0	0
145-216 mg/dl (8.05-12 mmol/l)	1	2	4
217-288 mg/dl (12.05-16 mmol/l)	2	4	6
289-360 mg/dl (16.05-20 mmol/l)	3	5	7
361-432 mg/dl (20.05-24 mmol/l)	4	6	8
>432 mg/dl (>24 mmol/l)	6	8	10

Oral Hypoglycemic Drug Summary						
	Drug	**MOA**	**BGL Drop**	**Dose /day**	**Contra-indications**	**Place in therapy**
	Metformin ***Glucophage***	Insulin sensitizer	**NO**	**500-2.5 G**	**< GFR 30**	**1st line if no /moderate CV risk , obesity**
	Pioglitazone ***Glustin***			**15-30 MG**	**Heart failure**	**If No CV risk >> 2nd line after metformin**
SUs	**Glimepiride** ***Amaryl*** **Glicalazide** ***Diamicron*** **Glibenclamide** ***Daonil***	Insulin providers	**YES**	**1-8 mg** **160-320 mg** **1.5-12 mg**	**HF , CKD ,CVD**	**LAST LINE IN THERAPY**
GLP	**Liraglutide** ***Victoza S.C*** **Dulaglutide** ***Trulicity S.C.***	Incretin based therapy	**NO**	**0.6 – 1.8** **0.75-1.5/week**	**With DPP-4 [c]** **< GFR 30**	**Ist line in very high CV risk, HTN, ACS, HF, nephroprotection *(victoza)***
DPP-4 I	**Vildagliptin** ***Galvus*** **Sitigliptin** ***Januvia*** **Linagliptin** ***Trajenta***			**50-100 (with SU or CRCL <60 50/day)** **100/once (CRCL 45-30→ 50/<30→25)** **5 mg /once no renal adjustment**		**3rd line in CVD pts Not On Glutides (after SGLT-2 + metformin)** **2ND line in others (after metformin) [a]**
	Saxagliptin ***Kombiglyze***			**2.5 – 5 mg (CRCL <45→ 2.5 mg)**		**As previous but contraindicated in HF**
SGL-T	**Canagliflozin** ***Invokana*** **Dapagliflozin** ***Forxiga*** **Empagliflozin** ***Jardiance***	Renal reuptake Glu inhibit	**NO**	**100 mg /once** **5- 10 mg /day** **5-25 mg /day**	**< GFR 30** **Dehydration risk [b]** **Nephrotoxic drugs**	**Ist line in HF /Ist line in very high CV risk, HTN, ACS, nephroprotection *(jardiance)*** **2nd line after metformin in others**
	JANUMET JANUVIA + METFORMIN **GALVUS MET GALVUS + METFORMIN**		**NO**	**1 tab twice/day** **Once – twice/D**	**With GLP-1-RAs** **< GFR 30**	**1ST in no / moderate CV risk in patients uncontrolled on metformin alone**

a: metformin not recommended in critical illness due to risk of dehydration that may lead to lactic acidosis b: dehydration risk (fever, diarrhea, polyuria) c: DDP-4 I and GLP-1-RAs precaution: thyroid tumors /pancreatitis , CV: cardiovascular, SU: sulphonyl urea, GLP-1-RAs: glucagon like peptide1 receptor antagonist, DPP-4: dipeptyl peptidase 4 inhibitor, SGL-T2: sodium glucose co transporter 2 inhibitors

Ps : basal insulin place in therapy : HBA1C > or = 9 : combined with one agent according to comorbidity HBA1C >OR = 10 : + 2 agents

HEPATIC PATIENT

CHILD classification *2 clinical +3 labs* للحفظ

	1	*2*	*3*
Encephalopathy	Absent	Minimal	Severe
Ascites	Absent	Minimal	Moderate or severe
Serum bilirubin	< 2 mg/dl	2-3 mg/dl	> 3 mg/dl
Serum albumin	> 3.5 g/dl	3 - 3.5 g/dl	< 3 g/dl
INR	< 1.7	1.7 - 2.2	> 2.2(3)

5 - 6 points → Child A (well-compensated).

7 - 9 points → Child B (significant compromise).

10 - 15 points → Child C (decompensated) → Risk of intra-operative mortality is > 40%

(*2 severe + 3 تلاتات*)

→ Inotropes from the start لو ضغطه وقع المحاليل مش هتجيب نتيجة

MELD score (equation).

- Depends on 1-bilirubin,2- creatinine &3- INR ☞ MELD Na is more accurate.

Patients with chronic liver disease at home

- ↑↑ liver enzymes → give **silymarin**/ 8 hrs → cell membrane stabilizer.

☞ Silymarin plus = silymarin + N-acetyl cysteine (contraindicated in severe gastritis&hematemesis & ulcer). N-acetyl cysteine ميتكتبش معاه (ulcer , hematemesis after trauma الا لو مش بتنزل)

- ↑↑ bilirubin → give **ursofalk** tablet/ 8 hrs or قرصين الصبح و قرص بالليل→

1-not in ryle ,no absorption or يتاخد فى اكل الرايل 2- not in obstructive jaundice

☞Ursocol tablets can be crushed ☞ **Urso plus** → ursofalk + silymarin.

Assess direct/total bilirubin ratio + abdominal ultrasound for possibility of obstructive jaundice (IHBR dilatation) → for ERCP.

- Give oral **lactulose** → target is 2-4 motions/ day لو بيعدى 2-4 لوحده خلاص ما ياخدش.
- In case of ascites or edema → give **aldactone or lasilactone** according to severity & targeting ↓weight.

Aldactone in hepatic patients can be given in a high dose (100 - 400 mg/day).

Aldactone is contraindicated if serum creatinine > 2 .

- Patients with history of hepatic encephalopathy → give **Gastrobiotic** 550 mg / 12 hrs.
- Give **Cipro** 750 mg/week فى البيت يوم الجمعة to prevent SBP in cirrhotic patients with:

History of 1) SBP, 2)GIT bleeding, 3) ascites (ascitic fluid protein < 1.5 gm/dl) or 4) renal impairment.

ICU patients who are on antibiotic therapy → don't give cipro.

- In case of anemia → investigate for occult blood in stool → if positive: consider upper GI endoscopy + DD of anemia P ( )

6 Major Problems in Hepatic patients

(acute ودور على ال chronic محتاج علاج لل) hepatic لازم ينوروا فى دماغك اول ماتقابل اى عيان

When to suspect :

☞ In patients not known to be hepatic with

1- ↓ platelet count 2-↑INR 3-↓Na^+ 4-↓albumin

5-↑liver enzymes or

6-↑bilirubin → suspect liver cirrhosis → send virology او حملة 100 مليون صحه.& sonar

(all of them or some)

7-Earthy look

❶ *Hepatic Encephalopathy*

♦Diagnosis :

Examination :a) Flapping tremors يفرد كوعه ويبعد صوابعه وكأنه بيزق حيطه

,b) disorientation,

لو عنده minor flapping tremors متستعجلش في خروجه حتى لو كان oriented .

1)Intra : Consider CT brain if not recovering within 24 hrs of treatment to exclude intracerebral hemorrhage.(esp if there is signs of lateralization or not)

if there is lateralization , Do urgent CT ماتستناش 24 ساعه.

2)Extra : ☞ Check blood glucose to exclude hypoglycemia &hyponatremia <120

☞ ↑↑ ammonia ... لازم تبعتله

☞As DD of DCL(191)(mostly1- hepatic encephalopathy 2-hypoglycemia 3-ICH 4-Hyponatremia<120

♦ Treatment:

1. Lactulose enema added to oral lactulose.

☜ مهم بعد ما تتحقن مش بنفضيها عشان هتطلع clear وملهاش لازمة .. بنسيبها تعمل distension للقولون ويفضيها لوحده فيخرج الـ contents بتاعة القولون ... اتأكد إن التمريض بيعملها فعلاً.

إذا أردت أن تُطاع ف أمر بما يُستطاع

2. Hepamerz (L-orithine L-aspartate): combines with ammonia forming urea which is excreted by the kidney ... 4 - 8 ampoules once daily (no intervals) → maximum 1 amp /hr .D5% علي

هام جدا Contraindicated in renal impairment with serum creatinine > 3 (aldactone creat 2تذكر) (allowed in hemodialysis).

3. Gastrobiotic: 400 mg /8hrs or 550/12hrs.

❷ *Hematemesis*.(8 items)

Most common Causes of hematemesis :

1- cancer
2- DU or gastritis
3- Varicies
4- Rarely but life threatening aortic aneurysm

Management :

1. **ABC**.p(4)

Border line conscious level with hematemesis is an indication for intubation to avoid aspiration.

Two wide bore cannulae, CBC and cross matching for blood & plasma transfusion ± platelets.

2. **Gastric wash** with cold saline & adrenaline till it becomes clear.

In non-intubated patients: 250 ml at a time to avoid regurgitation & aspiration.

☜ لازم اللي بياخده يطلعه لو طلعو أكررهم... لو مش بيطلعه يبقى احتمال يكون perforated DU :

Look for air under diaphragm or collection by adominal ultrasound

3-PPI infusion: Losec (omeprazole), Controloc (pantoprazole) or Nexium(Esomeprazole)

(preperation acc to *stability*)

80 mg IV shot then 8 mg/hr → Then:

Losec 1 vial(40mg) / 50 ml → Rate: 10 ml/hr (stability is 5 hrs).

Or: Controloc or Nexium 2 vial / 50 ml → Rate: 5 ml/hr (stability is 10 hrs).

(for 72hrs infusion)

In case of cirrhosis → Nexium dose should be halved.

* If no available syringe pump →

vial 40 mg/ 6 hrs or / 12hrs. لازم تعرف ايه النوع الموجود عندك

* Continue till no more bleeding or upper GI intervention.

4. **Sandostatin (octreotide)** (amp=100 µg). IV not SC for 3 - 5 days → ↓ portal hypertension.

25 - 100 µg bolus followed by 25 - 50 µg/hr for 3 - 5 days.

5 .3rd or 4th generation cephalosporin for 5 days مهم

due to high incidence of SBP with bleeding varices !

6. **Coating drugs:** Mucosta, Maalox & Gaviscon → have no role with PPI.

7. **Upper GI endoscopy**:

a) If the patient is stable : upper GI within 24 hrs for source identification & treatment (band ligation, sclerotherapy if failed surgical control or Sengstaken tube).

b) If unstable:

1) resuscitation first &

2) urgent upper GI within 12 hrs → if failed consider surgical intervention or sungstaken tube.

3) If upper GI is free → arrange for colonscopy if occult blood +ve

8. **If proved to be DU (not bleeding varices):** stop antibiotics & sandostatin.

Do H.pylori Ag 1) in breath and 2) stool test better than blood test 3)biopsy

→ treated by triple therapy:

a) metonidazole, b)amoxicillin & c) clarithromycin.(combined او قرص)

In some cases, hematemesis may be due to leaking aortic aneurysm. Bleeding comes out through a fistula with the esophagus or the stomach after rupture → detected on upper endoscopy.

❸ *Spontaneous Bacterial Peritonitis*

Diagnosis:

Any hepatic patient with 1- ↑TLC,
2-↑CRP, 3-fever &
4- tense ascites or abdominal tenderness ايدك على بطنه بيتوجع

→ ascitic fluid analysis → neutrophils > 250 cell/cmm + culture & sensitivity.

Management:

1. Albumin: 1.5 gm/kg (9 vials) on day1 then 1 gm/kg (6 vials) on day 3 if :
   a)creat >1 b)bilirubin >4 c) BUN>30
2. Cefotaxime (claforan),
   Shift to Tienam, Meronem or Tazocin in case of
   1) no improvement after 48 hours
   2) hemodynamically unstable
   3)hospitalized for 48 hrs
   4) on antibiotics for 3 days.

   The same algorithm of antibiotic in unstable patient
3. Stop β-blocker عدو عيانين الكبد



❹ *Hepatorenal Syndrome*

Hepatic patient (cirrhosis & ascites) with:

1. Rising creatinine > 1.5 with no improvement after 2 days of volume expansion using albumin1gm /kg bolus(50ml albumin 20% = 10gm) & diuretic withdrawal
2. Not due to shock (the diagnosis is confirmed after management of shock)
3. No current use of nephrotoxic drugs
4. Normal renal ultrasound.

Management: (same as AKI)

- Exclude post-renal → Flush the catheter.
- Exclude pre-renal → Ensure adequate fluid state (by static & dynamic measures).
- Management of intrinsic renal (see AKI) PLUS :
  1. Albumin: 2 vials/12 hrs + Lasix.
  2. Splanchnic vasoconstrictors:

     A) ● Midodrine (α_1 agonist) 2.5-12.5 mg (1-7 tablets)/ 8 hrs

     PLUS Sandostatin (IVinfusion or SC shots).

     B) **OR** Glypressin (alone):

     Loading: 1 vial / 50 ml over 1 hour or direct IV shot.

     Maintenance: 1 vial / 50 ml → rate: 8 ml/hr.**or** shot /6 hours.

     NB: Stop splanchnic vasoconstrictors when creatinine becomes ≤ 1.4 mg/dl

     C) Levophed as glyopressin targeting ↑↑ MAP by 15 mmHg from baseline, if not responding to glyopressin
  3. Tapping in case of ↑↑ intra-abdominal pressure.

> Sandostatin & glypressin are relatively contraindicated in patients with chronic IHD & absolutely contraindicated in acute coronary syndromes.
>
> Glypressin infusion is more effective than direct IV shot. (as Lasix)

❺ *Hepato-adrenal Syndrome*

Any hepatic patient on inotropic support (even minimal doses, sepsis مش زى ال) should be supplemented with hydrocortisone 50 mg/ 6 hrs. يعني لو الليفو <5 حط glypressin

❻ *Hepatopulmonary Syndrome*

هام جدا: بتصحيه الاول عادي ولو مكانش كويس خليه flat

Dyspnic in semi-sitting.

Wake up the patient in supine position (platypnea).

Platypnea

- **Indications of Albumin: كل واحدة ليها جرعة مختلفة**
  1. Hepatorenal syndrome (2 vial/12hrs) .
  2. Spontaneous bacterial peritonitis (9 gm in day 1 , 6 gm in day 3).
  3. Hypovolemia, burn > 50% & septic shock in case of extensive resuscitation (30ml/kg) → Albumin5% (2vial 20%(50ml) +300 ml ringer).
  4. Plasmapharesis.by albumin or plasma .
  5. Acute kidney injury with hypoalbuminemia ≤2.5 mg +diuresis.
  6. Ovarian hyperstimulation syndrome with hypovolemia (in volume depletion otherwise use crystalloids).
  7. Tapping: after the 5th liter → give 1 vial for each 1 liter eg : 7 L = 2 Vials.
  8. Liver transplantation to restore lost volume or drain losses (albumin 5%, 2 vial 20% / 300 ml ringer).

  NB لو فضل البول < 50لمدة ساعتين يبقي العيان محتاج محاليل و زقة لازكس

  فتي 9. Nutritional hypo-albuminemia if serum albumin < 2 gm/dl.(↑intake either by 1-iv amino acids or 2- oral supplement (frusibin or ensure or biogainers)±Albumin .

  فتي 10. Moderate pleural effusion with hypo-albuminemia → give albumin + Lasix.

- **Stop β-blocker in hepatic patient with:**
  1. Hepatorenal syndrome.
  2. SBP.
  3. Refractory ascites.
  4. Systolic BP < 100 mmHg or MAP ≤ 82 mmHg.
  5. Serum Na^+ < 120 mEq/L.

  These conditions → ↓cardiac reserve →↑mortality.

- **Tapping is indicated in (a+b)**
  a) tense ascites with (gas distension علشان ممكن يبقى fluids ايدك على بطنه والسونار فيه)
  b) 1. Respiratory distress (even if associated with encephalopathy).

  
  Or

  2. Hepatorenal syndrome to ↓ IAP → ↑ renal perfusion.

- **Hepatic patients with massive pleural effusion:** Pig tail (mahurker or CVL) is more preferred (dilator واحد الازرق ← و الا خرارة السنين)
  than chest tube due to 1) poor healing after removal & 2)high incidence of bleeding (correct platelets & INR first)

- Albumin 20% vial → 50 ml containing 10 gm of albumin.
  Albumin 5% → prepared by adding 2 vials of albumin 20% to 300 ml Ringer.

Acute liver cell failure: (DCL + ↑bilirubin+↑ammonia+↑liver enz الافات)

- virology including HAV & abdominal ultrasound+ search for other causes as (drugs, ….)
- Treatment:
  1)ABC +
  2) ICU admission
  3) IV N-acetylcysteine (Hidonac)
  4) take care of hypoglycemia (very common, measure RBS / hr , if low give G25% infusion) +
  5) treatment of complications as hepatorenal $ & hepatic encephalopathy.
  6) Supportive TTT + previous 5
  7)If failed →liver transplantation.

Hidonac (high dose N-acetyl cysteine IV) / Rotacysteine	
Indications	**Dose (rate & volume)**
1- Paracetamol toxicity: more common in pediatrics if the dose is written in **(mg)** → So: write it in **(ml) or syrup .** 2- Liver cell failure with elevated liver enzymes (thousands). 3-Liver transplant. 4 - Tridil tolerance.(24-48 hrs as hypertensive emergency)	**Rate:** - 150 mg/kg in the first hour infusion slowly on 200ml G5% or Nacl in G5% not available. - 12.5 mg/kg/hr in the next 4 hours infusion slowly on 500 ml G 5% or Nacl. - 6.25 mg/kg/hr in the next 16 hours Up to 48-72hrs(depending on clinical evaluation esp in acute liver cell failure or transplantation) infusion on 1000ml G5% or Nacl .

Liver transplantation **(infection /rejection)**

1-معلومات علي ورقه +

Operative events-2

3-عيان الزرع (1)sonar + (2)immunosuppresant

➢**Any liver transplantations بنسأل الاسئله دي :** **1-(معلومات بكتبها على ورقه عيان الزرع)**

- **MELD** } **preoperative score**
- **CHILD**
- **Cold ischemia** } **intraoperative times**
- **Warm ischemia**
- **Blood transfusion amount of different component :plasma, platelets, cryo, Packed RBCS (DIC & relative indication for antifungal ,**
  absolute indication: re-exploration,dialysis)) .
- **Graft size 1% TBW of the recipient less than that⇨small of size.**

2-Operative events:

a)anastomosis (small intestine) b)problems in artery & vein

➢ **DONOR:**

a)Pain (controlled باية) b) Drain اد ايه

C) Ultrasound for (Artery –vein – graft- collection)

D) early ambulation and nutrition(prokinetics & ryle removal)

E) anticoagulation(INR 2لو هام جدا من اول يوم تسأل الجراحه هنبدأ امتى حتى).

➢**1)** In transplanted patients with any system derangement (unstable , hypoxic,DCL,renal) → check 1)artery 2) vein patency 3) graft homogenecity. سونار (graft اي تدهور في العيان بص على)

➢**2)** Immunosuppression: (one or more)

a – Prograph 0.5 mg & neural 50mg: avoided in مخ و كلاوي

1) CNS(behavior &tremors) or DCL →once detected ↓ dose. &2) renal disturbance

NB Altizem (CCB) increase level of prograph.

b- Cellcept 500mg: may cause thrombocytopenia **or**

- Myofortic: GIT disturbance ± thrombocytopenia.

c - Simulect: Iv a) intraoperative in patient with renal impairment &b) repeat on day 3.

May cause initial ARDS علشان مش بينفع نبدأ prograph or neural بدرى فى عيان الكلى

ثابت d-solumedrol : No CI , but can't be used as a solo immunosuppressive

80mg for 3 days → 40mg for 3 days →20mg for life & we can shift to solupred(oral)

.e-certican

NB: Invasive BP in LL more accurate than in UL in liver transplantation,BP in UL>L

IV FLUIDS

mEq/L	Normal saline	Ringer	Ringer lactate	Ringer acetate	Hypertonic saline 3%
Na^+	154	147	130	130	513
Cl^-	154	156	110	110	513
Ca^{+2}	-	4.5	2	2.5	-
K^+	-	4	4.5	4.5	-
Lactate	-	-	30	-	-
Acetate	-	-	-	30	-
Osmolarity	308	312	273	273	1026
	Isotonic	Isotonic	Hypotonic	Hypotonic	Hypertonic

In pediatrics :ringer acetate or lactate better(deficit & losses) →more physiological في العمليات ,,in icu →pediament or neoment or glu 10%(maintainance).

Isotonic fluids in 1-post attrest 2-TBI 3-عمليات المخ

Fluid infusion sets

	Blood transfusion line	Venous line	Soluset
1 ml equals ?	10 drops	15 drops	60 drops
Number of drips/minute to give a certain volume/hour. عدد النقط فى الدقيقة عشان يخلص فى ساعة	Target volume / 6 To give 120 ml/hr → 120/6 = 20 drops/min.	Target volume / 4 To give 100 ml/hr → 100/4 = 25 drops/min.	Target volume / 1 To give 100 ml/hr → 100/1 = 100 drops/min.

بشرط 1- الزجاجه مخرومه No –ve pressure و 2- السكه سالكه و 3-مفيش وصلات ثلاثيه كتيره

How to select a vein for cannulation ?

1◆ Visible.
2◆ Palpable.
3◆ Straight.
4◆ Distal
5◆ Not over a joint(position وراحة المريض).
6◆ Non-dominant hand.مفيش كانيولات فى الرجل لغير الأطفال
7◆ Least painful area (medial side of forearm & ante-cubital fossa).

Cannulation in pediatrics:

الجراح ميمدش ايده على الطفل الا فى 1-وجود كانيولات مناسبه للعمليه 2- فى اوردة مبتفرقعش حتى لو اتأجل العيان او صحى العيان 3-extension line (arterial)-4 no air bubbles

1)Visible or palpable → 2) Blind cephalic →3) Blind basilic→4)blind saphenous → 5)transverse vein below lateral malleolus تاخده من بعيد قصير →

6)External (transverse : extend neck حط (حاجة تحت كتفه عشان) →7) CVL or venous cut down →8) Open CVL ... in emergency situations: intra-osseous injection…in mursmus →ant. Shoulder vein ,saphenous in medial aspect of tibia ورا الركبه .

☞ Blood volume: ml/kg.

Neonate: 95 ml/kg., Pediatric: 85 ml/kg., Adult male: 75 ml/kg., Adult female: 65 ml/kg..

☞ **Point of transfusion**:

A)● $\frac{Actual\ Hct\ or\ Hb - Target\ Hct\ or\ Hb}{Actual\ Hct\ or\ Hb}\ x$ **Blood volume**

→ Assuming continuous replacement with fluids الاصح والاخطر .

Actual Hb = Hb after resuscitation

Eg : in adult $=\frac{13-7}{13}\ x$ **Blood volume** , if cardiac $=\frac{13-10}{13}\ x$ **Blood volume**

B)● 20 % of blood volume in fit adults, 10 % in pediatrics ,geriatrics, cardiac or TBI patients.

→ If adequate replacement is not guaranteed

Provided gradual loss ,,لو انت مش ضامن الجراح أو نايب صغير و واقف على الحاله.

- once major vessels injury→don't wait transfusion Point &replace it rapidly with syringe .

C) ● Repeat Hb الادق

☞before resuscitation هام جدا جدا

اي عيان جايلك من الاستقبال و معاه معامل اتسحبت لازم تعيدها تاني بعد ال resuscitation عشان هيبقي الهيموجلوبين اقل eg. Scalp surgery or hematoma

☞Decreasing blood sampling in ICU → ↓↓ the need to blood transfusion by 30-50%.

☞ Blood transfusion is required in ICU in the following conditions:

Target Hb

1- if below it: transfuse

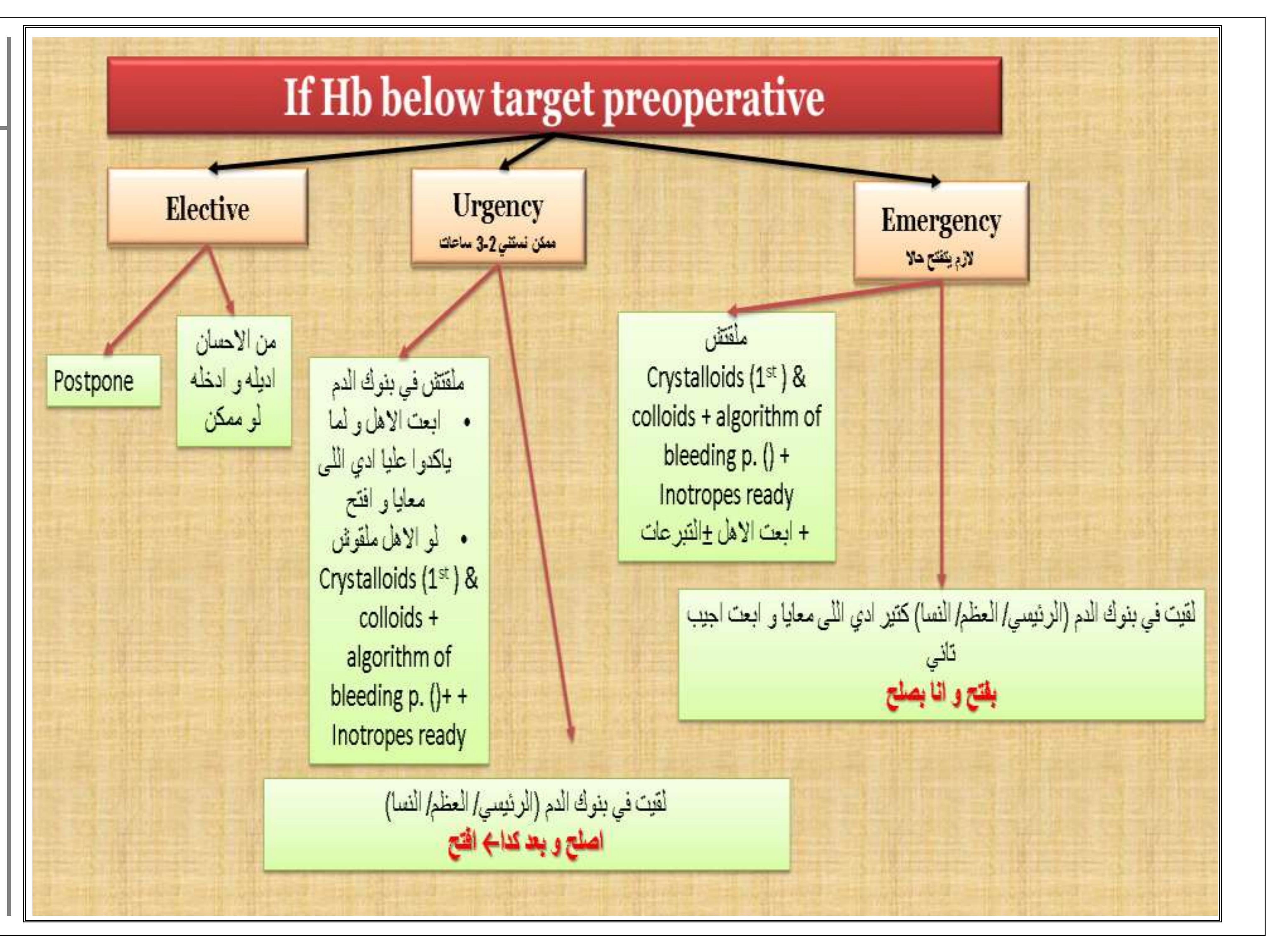
2-if above it:

a)in active bleeding transfuse early

b)in gradual bleeding wait until reaching the target)

- Hb < 7 gm/dl.(adult fit or > 50% baseline if baseline >14)
- Hb < 9-10 gm/dl in cardiac, pediatric & head trauma (TBI).
- Hb drop > 50% in patients with high Hb, e.g, high altitude.

☞ **Blood transfusion:** in Pediatics10 ml/kg → ↑ Hb: 3 gm/dl roughly & repeat labs دليل after transfusion, in Adult 1 unit ↑Hb. 0.5:1 gm


If Hb below target preoperative
Elective
Postpone
من الاحسان
اديله و ادخله
لو ممكن
Urgency
ممكن نستني 2-3 ساعات
ملقتش في بنوك الدم
• ابعت الاهل و لما ياكدوا عليا ادي اللى معايا و افتح
• لو الاهل ملقوش
Crystalloids (1st) & colloids + algorithm of bleeding p. ()+ + Inotropes ready
لقيت في بنوك الدم (الرئيسي/ العظم/ النسا)
اصلح و بعد كدا← افتح
Emergency
لازم يتفتح حالا
ملقتش
Crystalloids (1st) & colloids + algorithm of bleeding p. () + Inotropes ready
+ ابعت الاهل ±التبرعات
لقيت في بنوك الدم (الرئيسي/ العظم/ النسا) كتير ادي اللى معايا و ابعت اجيب تاني
بفتح و انا بصلح

Plasma transfusion:

15 ml/kg → ↑ PC: 30%. roughly & repeat labs دليل after transfusion بعدها على طول.

☞ Half-life of endogenous coagulation factors is 2 days while as exogenous ones (plasma) have a much shorter half-life (< 24 hrs).

البلازما اللي بديها بتنتهي بحد أقصي 6 ساعات عشان كده لو هديها عشان اظبط INR قبل عملية ، اديه و دخله خلال 6 ساعات .

☞ Half-life of albumin is 2 weeks.

☞ So in acute liver failure, coagulopathy develops rapidly while as albumin is normal.

☞ In chronic liver failure both(albumin & INR) are affected.

Indications of plasma transfusion

1-massive blood transfusion 1:1:1 (RBCs: plasma :plateltes) esp. in traumatic conditions & DIC other than that Query .

2-before major operation INR <1.2

3-INR>1.6 preoperative to prevent active bleeding in pt on anticoagulation therapy.

4-in warfarin toxicity

Platelet transfusion: (in IV line or blood line not used before)

6 units in 70kg patient , roughly increase platelet count 20000-40000 except in 1)sepsis , 2)DIC, 3)spleenectomy (less than the expected) repeat CBC ,

➢ **prophylactically transfused** if

1) plat.<10 000 in stable, non-bleeding
2) plat. <20 in stable, non-bleeding & temp.>38 or undergoing invasive procedures
3) or ≤50 000 in active bleeding, surgery & invasive procedures.
4) Plat. ≤100 in ocular or neurosurgery & active bleeding.

NB plateltes transfusion not recommended for pt with intracranial hge(spontaneous or traumatic) who are on anti-platelet therapy

Dose in pediatrics: 5-10 ml /kg will increase platelet count roughly 50000-100000

☞ Response to blood, plasma or platelet transfusion is variable → so, repeat CBC or coagulation profile after transfusion. If platelets: 40 →6units , 30→12units , 20→18units

☞cold stored platelets save platelets for 1 year.

Plasma ماتديش plateletes فى الأطفال لو اديت

Massive blood transfusion :transfusion of 1)10 units (total blood volume) in 24 hrs or2) > 50% of TBV within 3 hrs or 3)four units in 1 hr .Ratio 1:1:1.

In incombatible blood transfusion :check K , Hb , PLT , INR ,Fibrin , FDPs

DIC has diagnostic score 1- platelets count 2-fibrin or D-dimer 3-prolonged pt 4-fibrinogen level

⮊Volumes of ..1- fresh blood 500ml 2-packed RBCs 300ml **balanceلازم يتكتبو فى ال**

3-plasma 200ml 4-cryo 15ml 5-plateletes 150ml

☞ Arterial extension line → 3-5 ml ...

Venous extension line → 7-10 ml…

12ml: جهاز الوريد

☞ Bottles are either:

- Pressurized: مستطيلة → بتفضى لوحدها من غير ما تتخرم- Non-pressurized: مدورة → عالي fluid level بتتطبق ويفضل فيها →

محتاجة 1-تتخرم أو 2-يتركب فيها جهاز وريد بصمام يدخل هواء في الازازة عشان يعادل الضغط زي فكرة الابرة اللي بتحطها في فيال البرفلجان

Fluids with osmolarity less than 900mosm/L can be infused in a peripheral line such as: Glucose 5% (278), Glucose 10% (555), Panamin (507), Aminoleban (768).

☞ Fluids with osmolarity more than 900 mosm/L should be infused in a central line to avoid thrombophlebitis, such as: Aminoven 10%(990), Glucose 25% (1389),hypertonic saline(1026).

NB:استثنائى الوحيد hypertonic saline administration in peripheral line carries low risk of thrombophlebitis which is aminor complication coparing with the complications of cvl (large vessel thrombosis , infections,pneumothorax ,…)

NB: **if hypertonic saline is not available** ,you can prepare it :

200ml sodium bicarbonate +300ml saline is equivalent to 500ml sodium chloride 3%

→ , هيعمل alkalosis و يزود الصوديوم

DRUGS INFUSION

☜ كل مكان ليه fixed preparation معروف للأدوية ... زي عندنا الأدرينالين بيتحضر 3 أمبولات على 50 سم .

☜ كل سرنجة لازم مكتوب عليها التحضير بتاعها .

☜ في تحضير الأدوية في الأطفال بنرجع للبروتوكول p(242)؛ أو بنحضرها بالتقريب لـ 70 كيلو ← يعني لو طفل 35 كيلو ياخد نص تحضيرة الكبار ؛ وهكذا (3 steps) CITE

☜كل الادوية بتتحل علي جلوكوز 5% ماعدا الـ cancidas , Invanz ,tienam.Epanutin. لأنه بيترسب في الجلوكوز

☜اى امبول هتفتحه لازم تتأكد من الاسم وال concentration فى امبولات كتير متشابهه تبص قبل ماتفتحه وبعد ماتسحبه وقبل ماترميه

اللیفو والادرینالین

1) لو حاجه فيهم ماشيه لوحدها يمشى من غير صمام ثلاثى وادى bolus 0.5ml علشان تتأكد انه وصل

2) لو الاتنين ماشيين يمشوا مع بعض بصمام ثلاثى

3) وممنوع اى حاجه تانى تمشى معاهم ولا تعمل flush ولو توقفه لازم تسحب من ال line الاول قبل ماتمشى حاجه

3)ولازم تتأكد ان ال line مفتوح وواصل للعيان مش مقفول عليه

4) ركب كانيولات كبيره لو هتمشى حاجات كتير او هتعمل resuscitation خصوصا فى ال double lumen

5)أول ما تشوف infusion اتأكد إنه ماشى مباشرة فى ال canula

Inotropes

1. Noradrenaline (Levophed):

- ♦ 2 forms → monotartrate اللي عندنا and bitartrate.
- ♦ 3 available preparations (ampoules): 4, 8 & 16 mg.

step1 هام♦ How to prepare(كام على 50 مل):

16 mg bitartrate or 8 mg monotartarate /50 ml of glucose 5% .

Step2 ♦ Infusion rate of 2.5 ml/hr in 70 kg adult = 0.1 mic/kg/min.

Step3 ♦ Usual Dose: 0.05 - 0.8 mic/kg/min.

♦ Maximum rate → 20 ml/hr = 0.8 mic/kg/min (maximum dose).

- بس في أوروبا والدول المتقدمة بيقولوا مفيش maximum dose لليفوفيد .

- هام جدا: ممكن نعدي الـ maximum levo في حالة الـ reversible causes زي عيان hemorrhagic shock والدم جاي في الطريق ، أو عيان بيتحضر لـ liver transplantation والمتبرع جاهز او عيان زارع.

♦ Indications:

1. Septic Shock
2. Cardiogenic Shock
3. Hypovolemic Shock
4. Pediatric **warm** septic Shock→if mixed venous affected →add adrenaline 1st.
5. Pediatric cold septic shock (after maximum dose of adrenaline).
6. Spinal shock without bradycardia

2. Adrenaline:

♦ 2 available preparations (ampoules): 0.25 mg & 1 mg.

Step1 ♦ How to prepare: 3 mg / 50 ml of glucose 5%.

Step2 ♦ Infusion rate: 7 ml/hr = 0.1 mcg/kg/min.

Step3 ♦ Dose: 0.05-0.3 mcg/kg/min.

♦ In 70 kg patient, maximum dose is 21 ml/hr

♦ Indications: 1st choice in bradycardia

1. Persistent hypotension despite use of maximum levophed dose.
2. Spinal shock with bradycardia
3. Heart block (temporary till pacing)
4. Pediatric cold septic shock syndrome
5. Pediatric warm septic shock with BP controlled with levo but **low mixed venous saturation** (to improve COP & perfusion)even not maximum dose.
6. Anaphylactic shock (IM or IV)
7. Status asthmaticus (1 mg/50 ml → Rate 1-2 ml/hr)

♦ Adverse effects:

1) arrhythmia & 2) lactic acidosis.(as zyvox ,oral hypoglycemic)

Dopamine:

Step1♦ How to prepare for infusion: 200mg(amp) /50 ml of glucose 5%.

Step2♦ 1 ml/hr = 1 mcg/kg/min in 70 kg patient.

Step3♦ Dose: 5-20 mcg/kg/min.

♦ Indications:

1. Pediatric septic shock (if other vasopressors are not available).
2. Cardiogenic shock (in very rare situations ... if 1) tachycardia or 2) arrhythmias occur then stop).

dopamine renal dose مفيش حاجة اسمها ☜ هام جدا

Dobutamine:

1♦ How to prepare for infusion: 250 mg(amp) / 50 ml → 1 ml/hr = 1 mcg/kg/min in 70 kg patient.

2♦ Dose: 1-20 mcg/kg/min.

3♦ Indications:

1. Low mixed venous saturation in Septic shock & Hb >10 gm/dl.
2. Cardiogenic shock if BP can tolerate.

1. Tridil (Glyceryl-trinitrate)

- ♦ 2 available preparations: amp 5 mg/ml(50mg) & vial 1 mg/ml (50mg).
- 1 ♦ How to prepare for infusion: 50 الفيال بيتسحب زي ما هو علي سرنجة
- 2 ♦ Dose: 0.5-10 mic/kg/min.
- 3 ♦ Infusion rate of 2 ml/hr = 0.5 mic/kg/min.
  Maximum rate (dose): 40 ml/hr (10 mcg/kg/min.).
- ♦ Indications:

a- AMI, ACS if hemodynamically stable (0.5-2 ml/hr), better than nitroderm patch.

b- Hypertensive crisis (tridil infusion+ dual oral antihypertensive at maximum dose except ischemic stroke) after control of pain & shivering .

c- Stroke: SBP 220 mmHg is accepted → Reduce SBP 20% after 24 hours unless with TPA 180.

In case of hemorrhagic stroke → Target SBP is 140-150 mmHg.

d- Spasm of cervix & lower esophageal sphincter: 50 μg IV shot.

♦ Tolerance: after 24-48 hrs, effect is under question cause enzyme that metabolizes it into nitric oxide is saturated → managed by 1) nitrate free period for 10-12 hrs then resume.

2) If resistant → N-acetyl cysteine IV → increases the enzyme.

Or3) phentolamine (Rogitamine) infusion (amp. 10mg/ml) bolus dose 5-15 mg ,Maintenance dose :5-40mg/hr or labetalol.

2. Glypressin (terlipressin)

- ♦ Available preparation: Ampoule = 1 mg. vial = 370 LE ,patient takes 5 vials daily
- ♦ Dose in 70 kg patient: Loading 1 mg over 1 hr (امبول علي 50 مل بمعدل 50سم/ ساعة)
  Maintenance 1 mg /6 hr(8ml/hr). أمبول على 50 سم بمعدل 8 سم
  ... وينفع يتاخد شوت في hepatorenal syndrome فقط .
- ♦ Indications:
  - Hepatorenal syndrome (infusion has better outcome over shots) till creat 1.4.
  - Persistent hypotension despite use of maximum levophed & adrenaline doses.
  - Hematemesis. **Especially in hopeful patient**
- ♦ Contraindications:
  - Ischemic heart disease.

لو عيان عنده angina أخد glypressin يقلب MI

3. Proton pump inhibitors:أي PPI syringe أول ما أشوفها ينور فى دماغي ايه اللي ماشي

- ♦ Dose: Loading 80 mg IV shot ... Maintenance 8 mg/hr

  If no available syringe pump → 40 mg/6-12 hrs shots.

- ♦ Preparation according to drug stability:
  - Losec (omeprazole) → 5 hrs → So: 1 vial/ 50 ml → Rate: 10 ml/hr. Stability 5 hours
  - Controloc (pantoprazole) & Nexium (esomeprazole) → 10 hrs → So: 2 vial/ 50 ml→ Rate 5 ml/hr. Stability 10 hours.

- ♦ Indications: Hematemesis.

In case of cirrhosis → Nexium/Diflucan/tygacil/cordarone/dalacin dose should be halved(hepatic adjustment).

Pediatrics Take care & prepare

*تحضيرالأدوية يكون 1×1 أو 2×2 على حسب وزن العيان ..و أنا بحقن بترجم الcm لKg فى دماغي

➢Ventilation TV(10ml/kg) ➢Physiological, Anatomical &pharmacological difference.

➢allowed blood loss & premedication eg. atropine

A)6 Hypo. B)Neonates C)Syndromes D)Special consideration to each surgery.

(A) Avoid the 6 Hs

1)Hypoxia عينك على ال bag

➢Causes of hypoxia

→ check that ETT not endobronchial tube

→Pulse-oximeterلأنه هيقفل على إيد الواد hypoxia مع الوقت هيعمل
→Indicator of air embolism in specific surgery

2) Hypoventilation

➢Ventilation is mainly diaphrgmatic

a)TV 10ml/kg b)Rate 20-30 /min. c)Chest expansion.

d)non-cuffed tube pack ممكن أحط e)capnography f)blood gases لازم أسحبها فى أول العملية و نصها و أخرها

3)Hypothermia prevention ينور فى دماغي In neonates =Irreversible arrest

a-Type of pt esp. (pediatrics & geriatrics)
b- Anesthesia
التخدير = سوايل (كل حاجة دافية حتى الدم)+ غازات (humidifier & filter)
c-أوضة العمليات = تكييف لازم يتقفل
الجراح = 1-غسيل 2- فوط سُخنة 3-جرح صغير 4- سرعة-d
*العيان يتلف ب **قطن** إلا لو هيغسلو البطن ساعتها أجيب كيس وألزقه **على القطن.**
* الرأس تتلف قطن و يتربط عليها Head is relatively large in children
*خرطوم الهوا -Mattress الحرارة 43 (و المروحة أعلى حاجة)مش بتحرق (الجوانتيات السُخنة بتحرق)
*لمبة ال servo بتلف لوحدها لو الطفل Neonate

4)Hypovolemia line for sampling (CVP or arterial) عمليات كبيرة يبقى لازم

A)Lines تتثبت ب بلاستر أنبوبة
- arterial for mintoring or sampling
- venous = wide bore canulaفى وريد ما يضربش p()

Cannulation in pediatrics:

الجراح ميمدش ايده على الطفل الا فى 1-وجود كانيولات مناسبه للعمليه 2- فى اورده مبتفرقعش حتى لو اتأجل العيان او صحى العيان 3-extension line (arterial) 4-no air bubbles

1)Visible or palpable → 2) Blind cephalic →3) Blind basilic→4)blind saphenous →

5)transverse vein below lateral malleolus قصير تاخده من بعيد →

6)External (transverse : extend neck حط ((حاجة تحت كتفه عشان →7) CVL or venous cut down →8) Open CVL ... in emergency situations: intra-osseous injection…in mursmus

→ant. Shoulder vein (extension of cephalic between deltoid & pactoralis major ms) ,saphenous in medial aspect of tibia ورا الركبه

8)Extension lines 9)Air bubbles

*كل ما الوزن قل يبقي arterial extension عشان flush

*الحقن In lane ب سرنجة صغيرة عشان الوريد ما يفرقعش

B)Volume

Fluid maintanenence = 100ml /kg/day 1st 10kg

50ml/kg/day 2nd 10kg

25ml/kg/day every kg >20

- Initial bolus of 10 - 20 ml/kg over 20 minutes.
- Maintenance:
  * Minor surgery: 3 - 5 ml/kg/hr.
  * Moderate surgery: 7 - 8 ml/kg/hr.
  * Major surgery: 10 ml/kg/hr.
- In emergency surgery:
  * Mild to moderate dehydration: 50 ml/kg over 4 - 8 hrs.
  * Moderate to severe dehydration 100 ml/kg over 4 - 8 hrs.
  * If surgery is imminent, infusion should be over shorter time
- If the patient is shocked:
  * Boluses of 10 -20 ml/kg can be given targeting endpoints. This can reach up to 60 80 ml/kg.

💣💣Resuscitation of bleeding & pediatric shock should be done in the golden hour as Dilatation of capillary bed after prolonged hypotension is irreversible

NB لو شكيت كتير أو قليل اتعامل على إنه فاضي على سولوسيت أو سرنجة مش ازازة أبداً خصوصا فى الاوزان الصغيرة, conjunctival edema للبقللة 1st sign .

NB Conjunctival edema (easily visualized) or congested ب السماعة early symptoms of congesion

c) Content

➪Deficit Ringer lactate or acetate(more physiologic)in loses &deficits calculated over 6-8hrs

➪ Maintanence: pediament ,ringer acetate or (glucose/saline) acc. to .4..2..1 role

☝الدم دافي و متوصل فى صمام ثلاثى من قبل ما يبدأو خصوصا فى العمليات الكبيرة أو very small baby or

estimated blood loss>10 % of TBV

☝لازم أسحب عينة دم (أول العملية -نصها -أخرها) CBC& VBG خصوصا فى العمليات الكبيرة

d) Perfusion 1-سماعة على قلب العيان 2- pulse مش بيقرأ 3-UOP 4-lactate

5- capillary refill time 6-الجرح مش بيخر كويس

5)Hypoglycemia esp.in 1)preterm 2)neonate 3) baby to diabetic mother

6)Hypo-electrolytes esp. Ca

(B)Neonates(preterm)

1-avoid hyperoxia target O2 sat.90% due to retinal hyperoxia

2- apnea can occur

<50wk follow-up 24 hr

>50wk follow-up 12hr

(C) Syndromes ⇦أسأل نفسي 4 أسئلة

1-Airway((Intubation & extubation

2- قلب كويس ➲ good activity & no basal crepitations

3-الأدوية هتأثر عليه ولا مش هتطلع من جسمه 4-حد من اخواته أو من العيلة مات

(D) special consideration (every operation has its tips & tricks

☞Weight= age ×2 +9 ☞Tube size =age/4 +4 أو مقاس الأنبوبة ✖3

☞Tube fixation=age/2 +12 السماعة أهم

*التركيبات تتقاس من بره CVL, ryle ممكن أحط قسطرة تشفيط for drainage الcatheter فيها Stent ما تتشلش غير بعد ما تركب.

Specific precautions for intubated | pediatrics (small ETT)

1. Suction every 2 hours بنفسك وتعمل جدول(الجروح وتقليب العيان) وتمضى عليه
2. Humidifier مليان و شغال
3. Bronchodilators (if wheezy).
4. Saline nebulizer
5. Solucortef شرطين if 1) wheezy 2)not responding to nebulizer.
6. If excessive secretion or repeated obstruction → change to volume control & elevate the pmax to avoid hypoventilation in case of tube obstruction with the same percutions of volume control p(63).
7. Tracheostomy: wash twice per day after day 6 .بنفسك
8. pulse الستارة ماتتشدش و جوانتي فى رجليه ملزوق عليه
9. تبص عليه بنفسك كل ساعتين.
10. X-ray حسب حالة صدره كل يوم أو اتنين

12.Spontanous breathing trial daily

Doses of Drugs

1-Flgyl & perfalgan = 1.5 ml/kg

** perfalgan in preterm 0.75ml/kg, less than 1 yr 1ml/kg

2-Tienam= 100ml/kg/day /6-8hrs

3-Meronam=60ml/kg/day /6-8hrs

4-Vancomycin= 60ml/kg/day /6hrs

5-3rd & 4th generation =50-100 ml/kg …..except in meningitis P()

6-Tygacil 2mg/kg ,, colistin 5 IU /kg decadrone 0.15 mg/kg , anti-fungal p (195)

☠Xylocaine toxicity☠

*Mainly diagnosed clinically

*Dependant on 1-timing 2- dose 3-site

*Symptoms(SAMS)S:slurred speech (circumoral numbness) ,A:altered CNS eg .drowsy ,
M: Ms twitching(tremors) ,S:seizures eg. Convulsions, respiratory depression

Management

1- Stop injection & call for help
2- ABC ⇨secure airway &start ventilation with 100% oxygen(avoid hyperventilation)
⇨ttt of hypotension & bradycardia

3-Control seizures by e.g dormicum avoid large doses of propofol

4-Avoid ➢vasopressin, CCB ,BB, other local anesthtics

5- Lipid therapy(20%) Bolus 1.5 ml/kg then infuse 0.25 ml/kg/min

Then reassess
- if Cardiovascular unstable →repeat bolus 1.5ml/kg
- Hypotension →double infusion dose 0.5 ml/kg/min

Maximum dose of lipid emulsion 10ml/kg in 30-60min

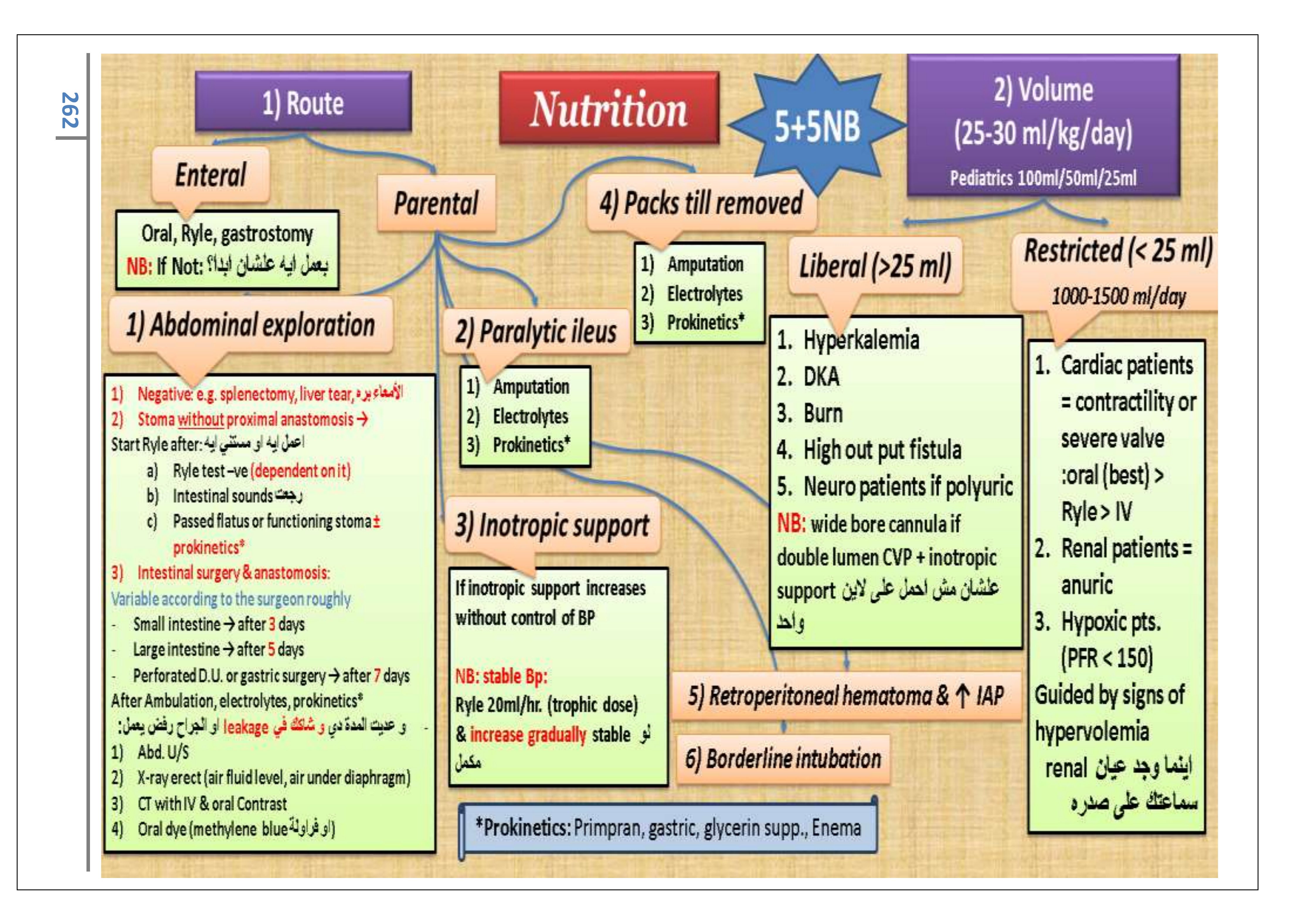
من الشمال لليمين و من فوق ل تحت

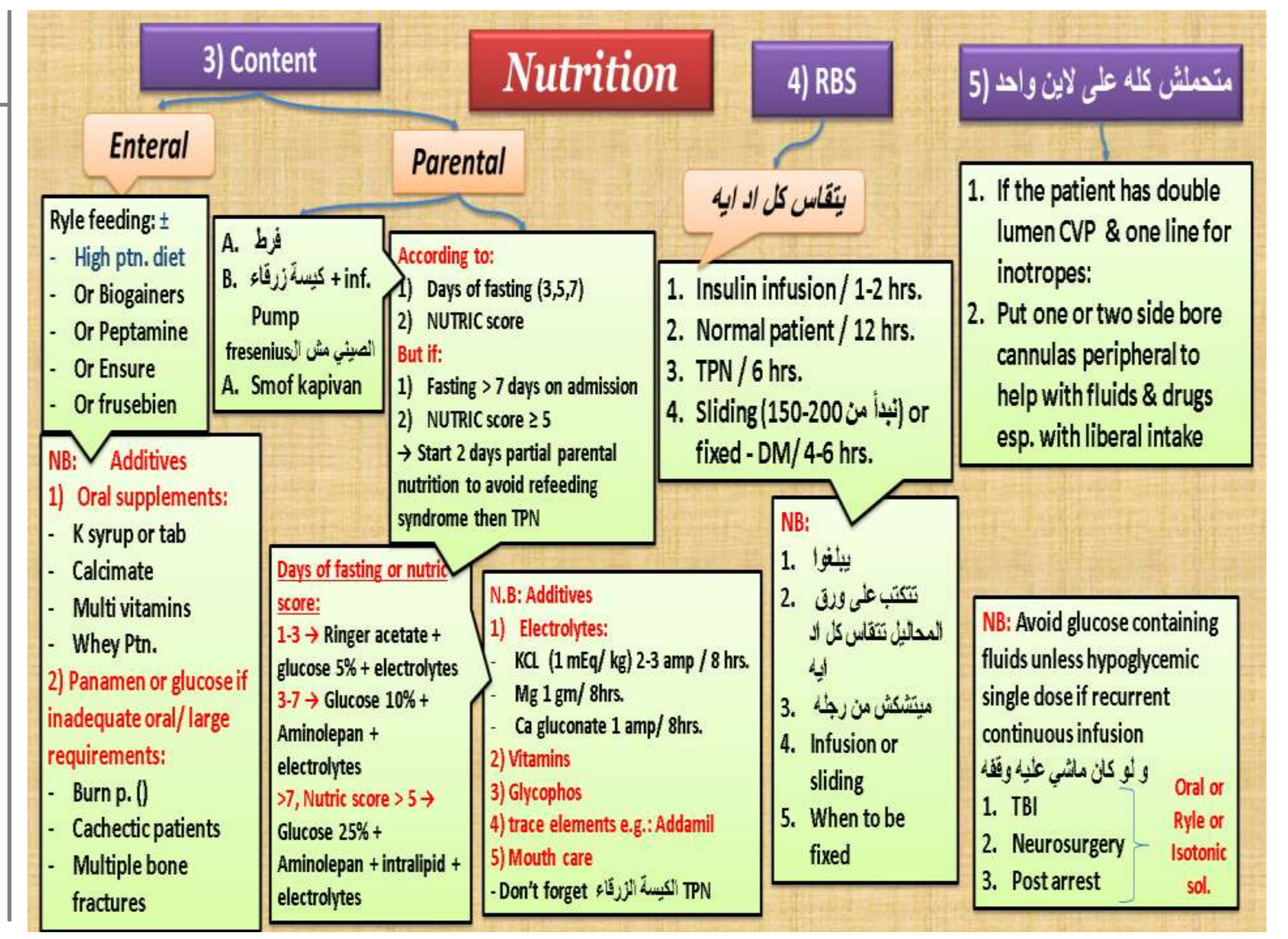
Pediatric Drugs Infusion

Drug (inf = infusion)	Dose range	1ml/hr =	Add to 50ml	Notes
Adrenaline (inf)	0.1-2.0 mcg/kg/min	0.1 mcg/kg/min	0.3 mg x wt	Intravenous, intraosseous. Always via CENTRAL line. In 5%dex or 0.9% N/S — Max 5 amp
Aminophylline (inf)	1 mg/kg/hr	1 mg/hr	x wt	Load 5mg/kg unless previous aminophylline. FIXED concentration mg/ml. Dose reduced infusion with age. Therapeutic range 10-20mg/l. Toxic tachycardia, jittery, seizures. Dilute in 5% dex
Amiodarone (inf)	5-15 mcg/kg/min	5 mcg/kg/min	15 mg x wt	Load 25mcg/kg/min for 4 hrs if no previous amiodarone . Baseline thyroid and liver functions. Only dilute in 5% dex. Not <600mcg/ml. Max 1.2g/24hrs. Baseline eye exam /TFT
Dobutamine (inf)	5-20 mcg/kg/min	10 mcg/kg/min	30 mg x wt	Vasodilatation and tachycardia. Central administration preferred if >5mg/ml.
Dopamine (inf)	5- 20 mcg/kg/min	10 mcg/kg/min	30 mg x wt	Central administration recommended. For peripheral administration 3x wt in mg (maximum 1.6mg/ml). Dilute in 5% dex or 0.9% N/S.
Esmolol (inf)	25-200 mcg/kg/min		x wt	Loading dose 500mcg/kg over 1 minute. Dilute to 10mg/ml through large bore vein. Dilute in 5% dex or 0.9% N/S. Recommended max concentration 20mg/ml (central administartion). Extravasation risk.
Fentanyl (inf)	1-5 mcg/kg/hr	1 mcg/kg/hr	50 mcg x wt	Usual dose 1 - 3 mcg/kg/hr. Cumulative effect. Risk of rigid chest in neonates. Discuss with consultant. Dilute in 5% dex or 0.9% N/S.
Furosemide (inf)	0.1- 1 mg/kg/hr	0.2 mg/kg/hr	10 mg x wt	Dilute in 0.9% N/S only. For concentrated infusions 50 x wt in mg = 1mg/kg/hr= 1 ml/hr. Incompatible with most common infusions
GTN (Glycerine trinitrate) (inf)	1- 5 mcg/kg/min	1 mcg/kg/min	3 mg x wt	Tachyphylaxis may occur after 24 hrs. Recommended maximum concentration 400mcg/ml. In fluid restricted patients 1mg/ml centrally
Heparin (inf)	10-30 units/kg/hr	20 units/kg/hr	1000 units x wt	Use APTT to direct therapy.Load 75units/kg. Start infusion at 20 units/kg/hr
Insulin (inf)	0.01- 0.2 u/kg/hr	0.05 u/kg/hr	2.5 units x wt	Dilute in 0.9% N/S only. Monitor glucose every 30 - 60 minutes at commencement.
Isoprenaline (inf)	0.02- 1 mcg/kg/min	0.2 mcg/kg/min	0.6 mg x wt	Neonates max 0.2 mcg/kg/min. Maximum for bradycardia 0.5mcg/kg/min. Up to 1mcg/kg/min for heart block. S/E Hypotension. Dilute in 5% dex or 0.9% N/S.
Ketamine (inf)	10-45 mcg/kg/min	10 mcg/kg/min	30 mg x wt	Anaesthetic, sialogogue. Hallucinations & emergence reactions worse in older children
Labetalol (inf)	0.5-3 mg/kg/hr	1 mg/kg/hr	50 mg x wt	Neonates start at 500mcg/kg/hr. Hypertensive crisis. Start slowly. Avoid rapid reduction BP. Dilute in 5% dex or 0.9% N/S.
Midazolam (inf)	0.5-20 mcg/kg/min	1 mcg/kg/min	3 mg x wt	Sedation at lower end of range. Seizure control higher doses. Cardiovascular depression. Dilute in 5% dex or 0.9% N/S.

3 2 1

Drug (inf = infusion)	Dose range	1ml/hr =	Add to 50ml		Notes
Milrinone (inf)	0.3-0.75 mcg/kg/min	0.5 mcg/kg/min	1.5 mg	x wt	Phosphodiesterase inhibitor.Vasodilator & inotrope. Dose reduction in renal/ liver dysfunction. Dilute in 5% dex or 0.9% N/S. May be administered centrally undiluted in fluid restrcition.
Morphine (inf)	5-100 mcg/kg/hr	20 mcg/kg/hr	1 mg	x wt	Bigger children may need higher doses for a few hours. Dilute in 5% dex or 0.9% N/S.
Noradrenaline (inf)	0.1-1 mcg/kg/min	0.1 mcg/kg/min	0.3 mg	x wt	Dilute in 5% dex or 0.9% N/S. Potent vasopressor. Administer centrally
Propofol 1% (inf)	1-4 mg/kg/hr	10 mg/hr	0 mg	x wt	1% = 1 kCal/ml in lipid. Use undiluted. Prolonged or high dose infusion associated with propofol syndrome (lactic acidosis and tachycardia)
Prostin (inf)	5- 100 ng/kg/min	10 ng/kg/min	30 mcg	x wt	Dinoprostone. NANOGRAMS. Dosing up to 100ng/kg/min for 30-60 mins. Apnoea common in first 24hrs. S/E hypotension, flushing, diarrhoea, low grade temperature. Dilute in 5% dex or 0.9% N/S
Salbutamol (inf)	1-5 mcg/kg/min	0.5 mcg/kg/min	1.5 mg	x wt	Dilute in 5% dex or 0.9% N/S. Preferable dilution is 25mg/50ml. Central administration if possible.
Sodium bicarbonate 8.4%(inf)	1-2 mmol/kg/hr	1 mmol/hr	0 mmol	x wt	Renal alkalinisation . Very alkaline. High extravasation risk. Central administration preferable, Dilute 1:10 peripherally.
Sodium nitroprusside (inf)	1-5 mcg/kg/min	1 mcg/kg/min	3 mg	x wt	Protect from light. Tachyphylaxis after 24 hrs. Toxicity with rising lactate and mixed venous saturations.
Thiopental (inf)	1-8 mg/kg/hr	1 mg/kg/hr	0 mg	x wt	Reconstitute with 20ml WFI to give 25mg/ml. Further dilute with 0.9% N/S if required. Status epilepticus. Accumulates in fat. Cardiovascular suppression. Extravasation risk
Vasopressin (inf)	0.0001-0.002 unit/kg/min	0.0005 unit/kg/min	1.5 units	x wt	Dosing range: low=0.0001u/kg/min; standard= 0.00025u/kg/min; high=0.0005u/kg/min; maz= 0.002u/kg/min. Dilute in 5% dex or 0.9% N/S.


1) Route
Nutrition
5+5NB
2) Volume
(25-30 ml/kg/day)
Pediatrics 100ml/50ml/25ml
Enteral
Oral, Ryle, gastrostomy
NB: If Not: يعمل ايه علشان ابدا؟
Parental
4) Packs till removed
1) Amputation
2) Electrolytes
3) Prokinetics*
Liberal (>25 ml)
Restricted (< 25 ml)
1000-1500 ml/day
1) Abdominal exploration
1) Negative: e.g. splenectomy, liver tear, الأمعاء بريء
2) Stoma without proximal anastomosis →
Start Ryle after: اعمل ايه او مستني ايه
a) Ryle test –ve (dependent on it)
b) Intestinal sounds رجعت
c) Passed flatus or functioning stoma ± prokinetics*
3) Intestinal surgery & anastomosis:
Variable according to the surgeon roughly
- Small intestine → after 3 days
- Large intestine → after 5 days
- Perforated D.U. or gastric surgery → after 7 days
After Ambulation, electrolytes, prokinetics*
- و عديت المدة دي و شاكك في leakage او الجراح رفض يعمل:
1) Abd. U/S
2) X-ray erect (air fluid level, air under diaphragm)
3) CT with IV & oral Contrast
4) Oral dye (methylene blue او فراولة)
2) Paralytic ileus
1) Amputation
2) Electrolytes
3) Prokinetics*
3) Inotropic support
If inotropic support increases without control of BP
NB: stable Bp:
Ryle 20ml/hr. (trophic dose) & increase gradually لو stable مكمل
1. Hyperkalemia
2. DKA
3. Burn
4. High out put fistula
5. Neuro patients if polyuric
NB: wide bore cannula if double lumen CVP + inotropic support علشان مش احمل على لاين واحد
1. Cardiac patients = contractility or severe valve :oral (best) > Ryle > IV
2. Renal patients = anuric
3. Hypoxic pts. (PFR < 150)
Guided by signs of hypervolemia renal اينما وجد عيان سماعتك على صدره
5) Retroperitoneal hematoma & ↑ IAP
6) Borderline intubation
*Prokinetics: Primpran, gastric, glycerin supp., Enema



Nutrition
3) Content
Enteral
Ryle feeding: ±
- High ptn. diet
- Or Biogainers
- Or Peptamine
- Or Ensure
- Or frusebien
NB: Additives
1) Oral supplements:
- K syrup or tab
- Calcimate
- Multi vitamins
- Whey Ptn.
2) Panamen or glucose if inadequate oral/ large requirements:
- Burn p. ()
- Cachectic patients
- Multiple bone fractures
Parental
A. فرط
B. كيسة زرقاء + inf. Pump
الصيني مش الfresenius
A. Smof kapivan
According to:
1) Days of fasting (3,5,7)
2) NUTRIC score
But if:
1) Fasting > 7 days on admission
2) NUTRIC score ≥ 5
→ Start 2 days partial parental nutrition to avoid refeeding syndrome then TPN
Days of fasting or nutric score:
1-3 → Ringer acetate + glucose 5% + electrolytes
3-7 → Glucose 10% + Aminolepan + electrolytes
>7, Nutric score > 5 → Glucose 25% + Aminolepan + intralipid + electrolytes
N.B: Additives
1) Electrolytes:
- KCL (1 mEq/ kg) 2-3 amp / 8 hrs.
- Mg 1 gm/ 8hrs.
- Ca gluconate 1 amp/ 8hrs.
2) Vitamins
3) Glycophos
4) trace elements e.g.: Addamil
5) Mouth care
- Don't forget الكيسة الزرقاء TPN
4) RBS
يتقاس كل اد ايه
1. Insulin infusion / 1-2 hrs.
2. Normal patient / 12 hrs.
3. TPN / 6 hrs.
4. Sliding (150-200 نبدأ من) or fixed - DM/ 4-6 hrs.
NB:
1. يبلغوا
2. تتكتب على ورق المحاليل تتقاس كل اد ايه
3. ميتشكش من رجله
4. Infusion or sliding
5. When to be fixed
5) متحملش كله على لاين واحد
1. If the patient has double lumen CVP & one line for inotropes:
2. Put one or two side bore cannulas peripheral to help with fluids & drugs esp. with liberal intake
NB: Avoid glucose containing fluids unless hypoglycemic single dose if recurrent continuous infusion
و لو كان ماشي عليه وقفه
1. TBI
2. Neurosurgery
3. Post arrest
Oral or Ryle or Isotonic sol.

NUTRITION (5+5 NB)

RBS frequency + Check with treatment  Check with GIT

Check with balance

هام تكتب السكر هيتقاس كل اد ايه فى ورق المحاليل و ورق التمريض مع التبليغ

- **On Insulin Infusion/ 1-2hrs**
- **Normal (not DM) /12hrs**
- **TPN /6hrs**
- **Sliding or fixed 4-6hrs**

Avoid glucose in : a) TBI b)Post arrest c)neuro patient (surgical or medical)
(unless hypoglycemic)

Intake: Route, Volume & Content & RBS &lines

A)Route: (ليه مش رايل وعملت ايه و هبدأ امتى)

- If not enteral (oral or ryle) → why & when to start وعملت ايه لحل المشكله لو فى مشكله.
- Daily ask about starting.+
acute &chronic problems مر علي→
any oral drug, you should start it once allowed .هام جدا
-if parenteral (NUTRIC score مش دخل امتي وتعرف لازم تعرف صايم من امتى)

B)Volume : +special situation

محاليل العيان بتاعة اليوم كله تتعلق على حامل جنبه علشان تتأكد انها اخر اليوم خلصت

مثلا لو ازازه فى اليوم = 20مل فى الساعه =20/4 =5 نقط فى الدقيقه بس لازم :

1- يمشي لوحده 2- no –ve pressure ومخرومه 3- عشان الازازة تخلص if dial flow , douple rate
4-رقمها واتأكد كل 6 ساعات

A* عادي*

Adults: 25-30 ml/kg/day.

Pediatrics volume & caloric requirements:

- 1st 10 kg → 100 ml/kg/day , 100 kcal/kg/day.
- 2nd 10 kg → 50 ml/kg/day , 50 kcal/kg/day.
- Every kg above 20 kg → 25 ml/kg/day , 25 kcal/kg/day.

-Special Situation:(B-**Restricted 1000-1500/day or الداخل قد الخارج**) 1-Cardiac,2-Renal,3-Hypoxia, Na & DKA, burn ,high -output fistula.

1 **Cardiac:** a)Poor left ventricular contractility or b) tight mitral or aortic stenosis.

- Oral intake is the safest route: STOP IV FLUIDS سيبه يتعايش مع نفسه
- If ryle: Give lower normal volume. It is safer than IV fluids.
- IV fluids is the most dangerous route: Give1) a restricted volume,
2) keep your eyes on1) dynamic volume state &2) lungs (سماعة وسونار).

2Renal

- anuric or CRF: give a restricted volume & check volume state (see p:218).
- End stage renal disease (on regular dialysis): Near normal volume (minimal restriction) with follow up of patient's weight (edema)

if cant tolerate dialysis →fluid restriction.

Restricted مادام العيان بيجيب بول كويس يبقي مش

3Hypoxia:P/F ratio <150 Give a restricted volume as page (110).

C-☝Liberal:1-Hypernatremia **p(201),** 2-**DKA p(220),** 3-**Burn p(161)** 4-**high output fistula** Liberal intake.

C)Content:↳Enteral +NB supplement ↳Parentral +NB supplement

TPN صايم من امتى و NUTRIC Score وبص على كيس ال

Consider entral feeding as soon as possible unless contraindicated + Daily question:

when to startوعملت ايه علشان تحل مشكلة انه مش بياخد فى ال ryle لو فى مانع

Ryle + supplement± electrolyte + vitamins

If not enteral: content depends on a)duration of fasting and b)NUTRIC Score

ممكن يكون صايم من قبل مايجيلك مش من يوم دخول الرعاية

1st 3 days of fasting (not admission): Ringer acetate + glucose + electrolytes (K, Mg, Ca) acc to requirement eg K 1meq /kg يعنى مش كل العيانين زى بعض .

☞ هااام Don't mix magnesium & calcium in the same bottle).

مثلا لو عيان وزنه 80 كيلو هتكتبله وتعلق على الحامل بتاعه ازازتين رينجر و 3 ازايز جلوكوز وتتأكد انهم اتاخدوا فى اخر اليوم وتكتب فى ورق المحاليل بعد بصه على الاملاح و الـ creat

Ringer acetate (2 bottels /day =40ml/hr =10 drops /min) + 1/3 cacl or 1 gluconate on every bottle + mouth care

Glucose5% (3 bottels / day =60ml/hr =15 drops / min) +2-3kcl +1gm Mg sulfate على كل ازازه

البوتاسيوم يتحط على اللى كل 8 ساعات

3-7 days: Partial parenteral nutrition:

eg in 80Kg :3bottels Glucose 10% (60ml/hr =15drops/min) +2-3kcl+1Mg& mouth care.

+ مينفعش 3 أزايز2bottels Aminolepan (40ml/hr=10 drops/min) + 1/3Cacl. (unless uncontrolled RBS).

After 7 days(consider refeeding syndrome p(256))

TPN or special formula قريبه منها:1)Fluids 2) Calories (CHO & fat), 3) protein, 4)trace elements, 5) electrolytes 6)vitamins. 7) Care of mouth 8)RBS

+ Daily question: when to start enteral .

☞ Start TPN earlier if NUTRIC score ≥ 5

☞ Consider partial nutrition from the start in burn, cachectic & multiple fractures patients.

☞ Avoid glucose containing-fluids &hypotonic fluids as acetate or lactate in the first 48 hrs in 1) neurosurgical or medical patient, 2)TBI & 3) post-arrest DCL

☞Don't start Enteral if the pt borderline intubation.

NUTRIC Score (nutrition risk in critically ill score)

Variable	Range	Points
Age	<50	0
	50 – 75	1
	> 75	2
APACHE II كل ما زاد احتمالات الوفاه تزيد Acute Physiological & Chronic Health Evaluation ⇨predict mortality	< 15	0
	15 -20	1
	20 – 28	2
	> 28	3
SOFA	< 6	0
	6-10	1
	>10	2
Number of co-morbidities	0-1	0
	≥ 2	1
Days from hospital to ICU admission	0	0
	≥ 1	1
IL-6	0 – 400	0
	> 400	1

☞ Start TPN as soon as possible if NUTRIC score ≥ 5

Benefits of nutrition

1-↓hospital stay,2-↓cost, 3- ↓days of ventilation,4-↓morbidity & 5- mortality & 6- improves wound healing.

Routes of nutrition

- 1- Oral.
- 2- ryle (nasogastric / nasojejunal),3- gastrostomy or 4-jejunostomy.
- Parenteral (partial or total).
- Mixed enteral and parenteral (if patient is losing weight with enteral feeding & burn cachectic & multiple fractures patients).

♦ Target: Starting enteral feeding as soon as possible to prevent bacterial translocation (fecal capsules), at least trophic 20 ml/hr.
♦ Oral fluids are good expectorants and improve chest condition.with good caugh relex (not bulbar) العيان اللي ما بيبلعش مش بيكح كويس
♦ Don't rely on intestinal sounds to start enteral feeding because 50% of patients with inaudible intestinal sounds have normal peristalsis.
♦1) Early ambulation is important in paralytic ileus +2)electrolytes correction +3)glycerin supp.
♦ **Surprise:** Enteral feeding is no longer contraindicated in patients on high doses of Vasopressors,a) Once the dose is constant, enteral feeding should be started with b) adequate BP.

Oral Feeding

لو عايز ابدأمن الاول او بتنقل من محاليل ل oral

- Indications:1) ability to swallow &2) no contraindication for enteral feeding.

A)Position و تواجد لحضرتك و للعيان

1-قاعد Sitting 30º - 45º اسند دماغه

2- فايقAlert

3- متشاف The first time should be witnessed especially if stroke patient to exclude bulbar symptoms.

B)Volume

4- Patient has access to food الاكل جنب العيان طول الوقت يقدر يطوله بايده عشان التمريض هتتشغل

5- Balance every 4 hours & ensure adequate oral intake, if inadequate → supplement by IV fluids to achieve 2 liters/day

و يتنبه علي اهله ان ازازه الميه بتاعته لوحده والعصاير بتاعته لوحده و تتحسب الكميه يوميا.

6- Fixed volume per hour.علبة عصير كل ساعتين

C)Content

- Start with clear water(witnessed) to avoid pneumonia if aspiration occurred.
- High protein diet يعني نص فرخة في اليوم زائد فيتامينات or ensure or frusibin or supportan + multivitamins.
- 1st day → overlap Ryle feeding & Oral, if adequate → remove Ryle

NB:

☜ لو عايز تبدأ للعيان oral or enteral feeding وخايف يكون عنده leak
لازم تعمل methylene blue or CT with oral contrast or Abdominal US / 12 hrs:

Ryle Feeding 12 item **(indication –CI-purpose-insertion-length-routes-precautions-when to start-content-methods-complications-termination)**

1. **Indications:** When enteral feeding is okay but oral route is not:
    - ♦ Intubated patient ♦ DCL
    - ♦ Bulbar symptoms ♦ Maxillo-facial trauma
2. **Contraindications:**
    - ♦ Paralytic Ileus: 1) correct electrolyte disturbance, 2) give prokinetics & 3) early ambulation. 4) If persistent after 3 days → exclude surgical cause (mechanical obstruction or leakage).
    - ♦ Intolerance to enteral feeding.
    - ♦ GIT leakage.
    - ♦ High inotropic support: 1) يعني maximum levo, maximum adrenaline 2) و مش ماسك ضغط
3. **Purpose:** Ryle is inserted either for feeding or for drainage.
    - ♦ Feeding: open every 6 hours to check residual volume → if 300-500 ml → intolerance → stop ryle feeding & do the following:
        - A ● Give prokinetics
        - B ● Correct electrolyte disturbance if present
        - C ● Restart with low volume & increase it gradually
        - D ● Consider bypassing stomach to reach jejunum or do jejunostomy
        - E ● ambulation
        - F ● Surgical cause
    - ♦ Drainage → make sure it drains properly.

    ☜ لو انت حاطط الرايل علشان تفضي بطن العيان و لقيت كيس الرايل فاضي و بطن العيان منفوخة يبقي 1-الرايل مسدود او 2- متنيه في بقه ولازم تعمله flush .

    - ♦ Ambulation if possible.
4. **Insertion:**
    - ♦ Non-intubated: 1)خلي العيان ينفخ من كل فتحة مناخير و أدخل من الفتحة السالكة + 2)afrin drops ,ephedrine & adrenalin يتحل على 10 سم .
        - ● Place Ryle in الفريزر to be rigid ● Head elevated
        - ● Stop at oropharynx → Wet cotton and ask patient to swallow
        - ● With first swallow → push Ryle ● if failed , Magil بس يكون صايم علشان تنيمه

لو مانفعش نيم العيان بس يكون صايم حط انبوبه مقاس أصغر (شيل الinternational فى مايه سخنه) واقطعها بالطول الأول ودخلها nasal وحط شاش بادرينالين او افرين الاول علشانماينزفش

ولو دخلت فى oropharynxوفى resistanceغالبا داخله تحت ال mucosaوهتعمل mucosal tear ماتتعافاش عليها دخلها من ال nostrilالتانى antegrade

- ♦ in intubated patient:
  - Magil Insertion لازم يبقي نايم: Elevate epiglottis with laryngoscope ±deflate cuff
  - Esophageal tube oral without international و عدي الرايل داخلها :

    و انت بتقطعها ايدك هتتقطع لف ايدك بشاش و اشرطها الأول و خلي بالك من رقبه العيان

- ♦ In case of 1) esophageal tumor or trauma or surgery

  ,2)gastric tumor or trauma or surgery

  3) perforated DU

  - Ryle is inserted only while operating the patient or by surgeon .
  - Don't insert ryle if displaced ,call surgeon to insert new one

5. **Length**

- In adults: between 2nd & 3rd marks→unless intraoperative ....لما الجراح بيشوفها ويحسها بنثبت عندها
- In children: has to be measured كل الخروم جوه...ولو قسطرة تشفيط تنفع يكون أسهل

6. **Routes:**

- ♦ Nasal
- ♦ Oral → only in intubated patients (in the following conditions: fracture base, bleeding tendency, difficult insertion) otherwise it increases risk of aspiration.

Special situation:

- ♦ If non-intubated with fracture base (cribriform plate):

  Unilateral fracture → insert nasal ryle in the healthy side

  1) very cautiously,

  2)not forcibly & 3)under vision.

  Bilateral fracture → do not insert Ryle

- ♦ If irreversible cause or ryle for > 1 month → consider gastrostomy (either surgical or endoscopic).if unstable after gastrostomy consider leakage.

7. **Precautions:**

Position ♦ Patient in semi sitting position all through feeding

Volume ♦ Initiate with Ryle test (أحقن 100ml و اقفل لمدة ساعة و بعدين أفتحها)

Content ♦ Residual volume during course 300-500 بفتح الرايل كل يوم الصبح ممكن تجيب

8. **When to start:**

- ♦ As early as possible.
- ♦ Ryle test (failure :ambulation +prokinetics +electrolytes)+surgical .
- ♦ In case of stoma:
  - Start immediately once functioning(stool بتجيب)(with no proximal anastomosis).
  - In case of GIT anastomosis:

    Small intestine: after 3 days ... Large intestine: 5 days ...

    Perforated DU or gastric surgery: 7 days.

بتبلغ الجراحة إنك هتبدأ enteral feeding ..بتلح عليه و لو رفض تسأله ايه المشكله، ممكن يكون عمل مشكلة في الـ proximal segment

- بره مصر بيقولوا:

→ Immediate oral intake after GIT anastomosis improves healing if compared with 3 days delay.

- In case of short bowel with stoma: start fluids, PPN & TPN as mentioned before + enteral feeding + replacement of high output fistula.

لو تمريض القاعة مضغوط ، مش لازم 100 مل كل ساعة ، ممكن 250 مل كل 3 ساعات .

9. **Content:** 1 ml = 1 Kcal.
   - قاذورات (رايل المستشفي) لا يسمن و لا يغني من جوع -
   - High protein diet. من بيته او تبلغ مطبخ المستشفي →
     بتتضرب في الخلاط و تتصفي كويس و أصب عليهاماية وأنا بصفيها علشان متبقاش viscid .
   - Supplementation (ensure, biogainer,frusebin)كل عيانين الحروق.
   - Full enteral nutrition: (expensive 1500 L.E/day)
   eg...a) Frusebein في منه 1سم بيدي 1 كالوري و 1 سم بيدي 2 كالوري
   (bags for ryle..≠bottles→diarrhea)
   b) Peptamin in jujonostomy + short bowel

10. **Methods:**
   - ♦ Continuous infusion (the best) (there is no such thing as night vacation)
     بنملاها 300 مل علشان اللي فيها ما يبوظش
   - ♦ Intermittent boluses → by gravity بسرنجة رايل
     → by force (obsolete)
   Wash with 10 ml distilled water to avoid food fermentation inside the ryle tube.

11. **Complications:**
   A) ♦ Of Ryle:
   - Sinusitis, pharyngitis, septal perforation.
   - Malposition, endotracheal, kinking.
   - Tracheo-esophageal fistula.
   - Aspiration.

   B) ♦ Of Feeding Related to formulas:1) intolerance (common),2) hypo/hyper electrolytes.

12. **Termination:**
   - ♦ Adequate oral intake.
   - ♦ After 40 days → do gastrostomy (endoscopic or surgical).
   If the patient deteriorates after gastrostomy consider peritonitis(leakage)→do FAST.

♦ Patients with moderate to severe acute pancreatitis should have a naso-enteric tube placed and enteral nutrition started at a trophic rate and advanced to goal as fluid volume resuscitation is completed.

♦ Trophic feeding (defined as 10–20 kcal/h(10-20ml/hr) or up to 500 kcal/d) should be provided for the initial phase of sepsis, advancing as tolerated after 24–48 hours to 60-70% of target energy goal over the first week.

Delivery of 1.2–2 g protein/kg/d is suggested.

اذا اردت ان تطاع فأمر بالمستطاع←لو هيعمل enema ←مرة واحدة في اليوم

Enema = care →overload on the nurses

Ryle and drugs :قراءة

➢ Don't crush the following drugs:	➢Alternatives:
Enteric coated drugs: ❖ Aspirin protect ❖ Exforge ❖ Alphintern	❖ Aspocid ❖ Norvasc + ARBS ❖ alpha chemotrypsin I.M
❖ Dinitra & Nitroglycerin	❖ sublingual tablets.
Very bitter taste:can be crushed but given by ryle not oral ❖ Tiratam tab(if coated not crushed) ❖ cordarone tab ❖ Nootropil	❖ Tiratam syrup or IV same dose ❖ cordarone IV half oral dose, ❖ Nootropil IV.
❖ Zantac ❖ Serequel XR ❖ Ursofalk ❖ Depakine ❖ Isoptin.	❖ IV zantac ❖ Serequel ❖ Ursocol tab ❖ Depakine syrup ❖ change isoptin
❖ L thyroxin	❖ increase the dose 0.25 mic in ryle ❖ 6am وصيام ساعه قبله و بعده

Parenteral Nutrition 5 items (route&requirements-type-when to start-complications- monitoring)

مهم جدا : اى كيس TPN الكيس الازرق لازم تشوف وتعلم بماركر و بخط واضح وعلقته امتي

1.expired date بس لو بره التلاجه اخره 24 ساعه لكن جوه التلاجه 2-3 ايام وبيبقى مكتوب عليه اتأكد الاول

2- Production date

3.when to start مكتوبه بخط ايدك بوضوح

4. when to end (after 24hr and check every 6 hrs) تاني يوم يبقي خلصان في نفس الميعاد

5.contents & calories [99% ptns are added to calorries)

6.trace elements and electrolytes لو مش موجوده زودها انت

7. لازم تتأكد بنفسك ان الكيس كله خلص فى خلال ال 24 ساعه من تعليقه لكن لو جوه التلاجه ممكن يقعد 2-3 ايام

8.in separate line (smoofkabivanلو ماعدا وملفوف→ كيس تغذية من وحدة التغذية مش في القصر العيني)

9-douple rate if by dialflow

➢1) **Type:**

a) Separate components

b) Preformed e.g. a)smof kapivan تبقي تخرجها أنت calories ال وفي ptn هيبقي مدخل ال

smof kapivan containing 85gm carbohydrate,38gm ptn, 34gm lipids (800 kcal including ptn =1200 vol.)

b) nutrition unit

calories, proteins, lipids, vitamins, trace elements & electrolytes ☜ لازم نبص على الكيس ونشوف الـ ونزود اللي مش موجود فيه من عندنا ونكلم وحدة التغذيه.

لازم تكتب تاريخ وساعة البدايه ومايعديش عليه 24 ساعه متعلق

☜ساعات بيبقي ال volume كبير فى الكيس و ال content قليلة جدا مش بينفع replacement وقتها اقلبها separate component وارمى الكيس

➢2) **Route & daily requirements:**

♦ Route: Central Line with intralipid in a separate central lumen.or peripheral line لوحده

♦ Daily requirements:

1- Fluids: 25 - 30 ml/kg/day بنحسب علي العالي

- In pediatrics → volume is calculated as :

1st 10 kg → 100 ml/kg/day

2nd 10 kg → 50 ml/kg/day

Every kg above 20kg→ 25 ml/kg/day

2- Calories:25- 30 Kcal/Kg/day بنحسب علي الواطي + consider stress factor (infection,burn,surgery)or special formula قريبه من الحسبه.

لو ال volume كبير اقلبها separate component

Pediatrics calories as volume roughly

- Calories are given as 70% glucose and 30% lipid (or 60% - 40%).

3- Proteins: 1- 2 gm/kg/day (not counted from caloric intake)

مالكش دعوه باللى مكتوب على الكيس احسب انت تانى.

4-electrolytes:

a- Potassium: 1 - 2 mEq/kg/day.

b- Magnesium: 300 mg/day (0.3 mmol/kg/day) 1gm $MgSO_4$=98mg elemental Mg

c- Calcium: 300 mg/day (0.1 mmol/kg/day) 1gm Cal. Glu.=93mg Cal. elementary

1gm Cal. Cholride=270mg elementary Ca

d- d- Sodium: 1 - 2 mEq/kg/day.

☞ Don't mix magnesium & calcium in the same bottle).

5- Trace elements: addamil, glycophous →in weaning ,hypophosphatemia .

6-Vitamins (soluvit + vitalipid), if not available → Give vitamin K, cevarol, becozyme.

7-mouth care

8-RBS

Eg. 70 kg (target full TPN→1750 kcal)…….. 1000 kcal smof kapivan =
125gm glu. →500 kcal ,30 gm fat →270 kcal ,60 gm ptn→240k cal

Intralipid30-70 جلوكوز يبقي كده الكيس فيه 770kcal و مطلوب أعوض للعيان الفرق

* 1 bottle Glucose 25% & 250 cm of intralipid 20% يبقي العيان محتاج

*Ptn 60→110 (1 bottle aminolepan) أحيانا وحدة التغذية بتبدأ بالقليل و بتزود شوية ب شوية لما نفهمها الوضع

- 1 gm glucose = 1 gm protein = 4 Kcal.
- 1 gm lipid = 9 Kcal.
- 500 cc of glucose 5% = 25 gm = 100 Kcal
- 500 cc of glucose 10% = 50 gm = 200 Kcal (in peripheral or central line).
- 500 cc of glucose 25% = 125 gm = 500 Kcal (in central line).
- 500 cc of Intralipid 10% =50gm= 450 Kcal (in peripheral or central line).
- 500 cc of intralipid 20% =100gm= 900 Kcal (in peripheral or central line).

☜ الـ intralipid مينفعش يتساب متعلق للعيان أكثر من 24 ساعة لأن الـ lipid يعتبر medium for bacteria و ممكن يدخل العيان في sepsis .

اي عيان ماشي علي IVfluids ، لازم electrolytes كل يوم خصوصاً عيانين المخ

- 500 cc of aminostril 10% = 50 gm protein (in central line)(1-2 gm/kg/day)
- 500 cc of aminolipan N-hep 8% = 40 gm protein
  a) (branched aminoacids more than aromatic aminoacids(false transmitters))
  less incidence of enchephalopathy. b) total ptn
- Nephrostril 6% or kidmen for renal patients اتلغي من الطب
- Dipeptivan (glutamine) is preferred in burn and neuro patients not in sepsis .
- Panamen G 2.7% & Panamen SG 8% have high chloride content & normal AG

☞ Drugs that cause thrombophlebitis if given in peripheral vein:
1-Cordarone,2- Aspegic (Acetyl-salicylic acid) &3- Potassium , 4-mannitol , 5-epanutine.

☞ Fluids with osmolarity less than 900mosm/L can be infused in a peripheral line such as: Glucose 5% (278), Glucose 10% (555), Panamin (507), Aminoleban (768).

☞ Fluids with osmolarity more than 900mosm/L should be infused in a central line to avoid thrombophlebitis, such as: Aminoven 10%(990), Glucose 25% (1389),mannitol (1100).

Eg:***TPN of Adult 70 kg*** :

1) Glucose 25% / 8 hrs +2-3 kcl+1mg =1500kcl
2) Amino /12 hrs +1 ca gluconate or 1/3 amp chloride = 100gm
3) 250 ml intralipid 20% / 24 hrs or 500 ml /48 hrs= 450 kcal if 250 ml or 900 kcl if 500 ml
4) Trace element ➢addamel (nonam)
5) Glycophos
6) Vitamins

7)Mouth care 8)RBS تكلم وحده التغذيه وتحسبها معاهم وتظبط الناقص

➢3) **When to start:**

- NUTRIC Score
- واحساب ايام الصيام

if NUTRIC >5 or 7th day of fasting start partial nutrition for 2 days to avoid refeeding $ حتى لو أول يوم دخول هو السابع فى الصيام

➢4) **Complications:**

- Related to Central line.
- Related to formula: Hypo and hyper :كل حاجة

  1-Volemia,2- glycemia, 3-proteins,4- lipid 5-vitamins 6- electrolytes 7-trace elements .

➢5) **Monitoring:**

- Electrolytes → daily.
- Glucose every hour until stabilized then every 6 hours

  لو بيعلى من غير سبب واضح الازازه بتجرى.

- Liver & kidney functions & CBC → every 3-7 days

Refeeding syndrome

ده عيان كان malnourished فترة طويلة وجالك الرعاية وانت بدأتله تغذية بالـ full requirements من الأول سواء enteral or parenteral nutrition

➢ **Clinical picture:**

♦ Severe electrolyte imbalance (hypokalemia, hypomagnesemia, hypophosphatemia & hypoglycemia)

♦ Severe acidosis,vomiting ,DCL, hypotension & organ dysfunction up to cardiac arrest.

➢ **Pathogenesis:** Intracellular shift of phosphate, potassium & magnesium→severe enzymatic dysfunction.

➢ **Management:**

1)ABC

2) Prevention:

♦ Supplement with potassium, magnesium & phosphorus.

♦ start with 50% of caloric needs and gradually increase intake as tolerated.

3)Supportive treatment:of symptoms &signs of all systems.

ECG

N.B; big □ = 0.2 sec

5 □ = 1 sec

300 □ = 1minute

ECG Analysis;-

1- Rhythm.
2- Rate.
3- P wave;-
   - **A**bsent or present.
   - **A**mplitude.
   - **D**irection
   - **D**uration
4- PR interval.
5- QRS ;-
   - **A**xis.
   - **A**mplitude.
   - **P**athological Q.
   - **C**onfiguration.
   - **D**uration.
6- ST segment.
7- T wave;
   - Duration.
   - Amplitude.
8- QT interval;- Duration.
9- Conclusion.

N.B;

- The wave is upright or downright deflection.
- The segment is an isolectric part.
- Interval = Wave + Segment.

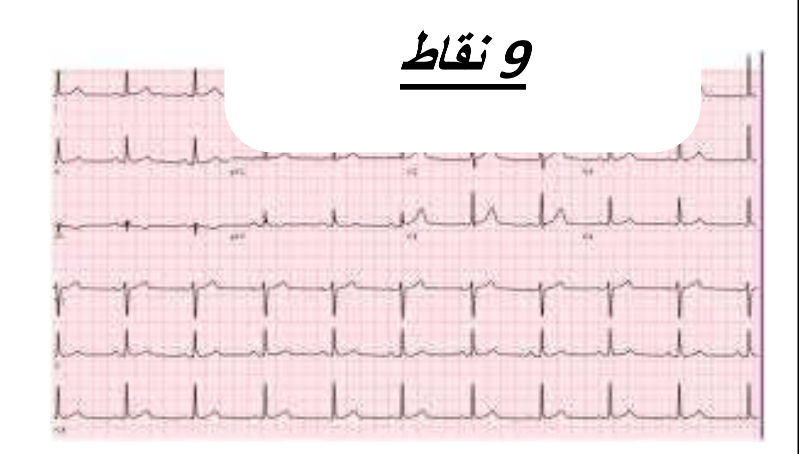
3 شروط تتأكد منها اول ما تبص ع ال ECG:

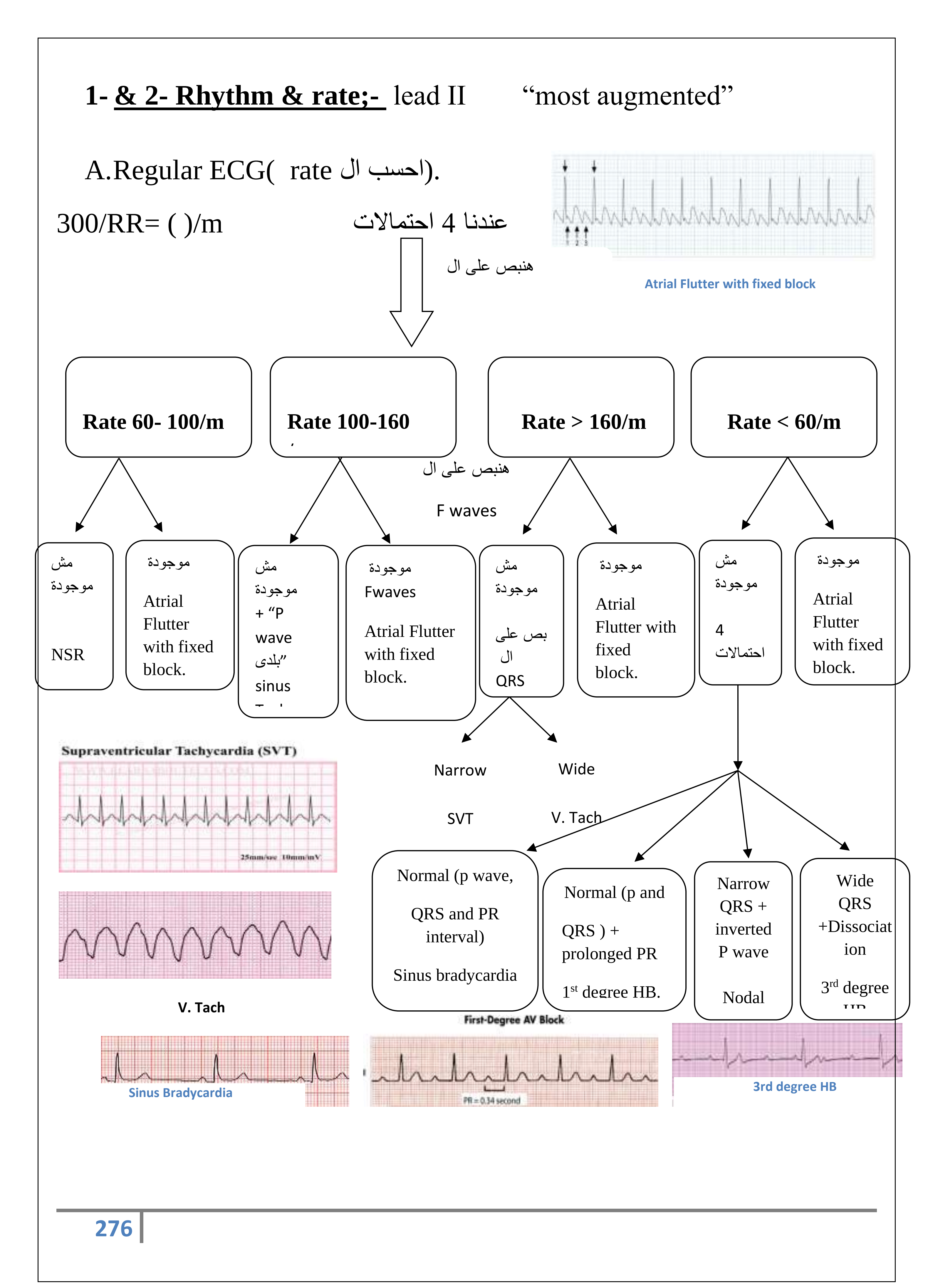
1- Voltage 10 mmvolt 2 □ كبير.
2- Speed 25 mmsec.
3- aVR مقلوب .

+

4- Comparative to old ECG. يعني تقارنه باللى قبله هل فى اى جديد؟!
5- Topographic according blood supply to myocardium.

- Anteroseptal: V1, V2, V3, V4
- Anterior: V1–V6
- Anterolateral: V4–V6, I, aVL
- Lateral: I and aVL
- Inferior: II, III, and aVF
- Inferolateral: II, III, aVF, and V5 and V6




1- & 2- Rhythm & rate;- lead II “most augmented”
A.Regular ECG(rate احسب ال).
300/RR= ( )/m
عندنا 4 احتمالات
هنبص على ال
Atrial Flutter with fixed block
Rate 60- 100/m
Rate 100-160
Rate > 160/m
Rate < 60/m
هنبص على ال
F waves
مش موجودة
NSR
موجودة
Atrial Flutter with fixed block.
مش موجودة
+ “P wave بلدى”
sinus
موجودة
Fwaves
Atrial Flutter with fixed block.
مش موجودة
بص على ال
QRS
موجودة
Atrial Flutter with fixed block.
مش موجودة
4 احتمالات
موجودة
Atrial Flutter with fixed block.
Narrow
Wide
SVT
V. Tach
Supraventricular Tachycardia (SVT)
Normal (p wave, QRS and PR interval)
Sinus bradycardia
Normal (p and QRS) + prolonged PR
1st degree HB.
Narrow QRS + inverted P wave
Nodal
Wide QRS +Dissociation
3rd degree HB
V. Tach
First-Degree AV Block
PR = 0.34 second
Sinus Bradycardia
3rd degree HB

B)irregular;-

نبص على ال P wave

- Absent and narrow QRS

  AF

- كتيرة

  Atrial Flutter with irregular block

- موجودة عادي

  4 احتمالات

  نبص على ال"

  - Normal

    Atrial extra-systole.

    Compensatory pause هتأكدها

  - Wide " >3 "

    Ventricular extra-systo□

    Compensatory pause هتأكدها

  - بعدها مفيش

    QRS

    + Gradual PR prolongation

  - بعدها مفيش

    QRS

    + Fixed PR

    Mobitz type II





3-P wave;- normally 3 × 3 □

A. Present or not:

lead II2. بنبص عليها ف

وبتسأل نفسك موجودة ولا لا

1- Absent or present → Irregular ECG >> AF
→ Regular ECG >> Nodal rhythm

2- Replaced by F wave; - regular or irregular.

Amplitude & width ; - if □>3 >> P. Mitral.

B. **Direction**;- الطبيعي انها

Upright in lead II.

Inverted in aVR.

Biphasic in V1.

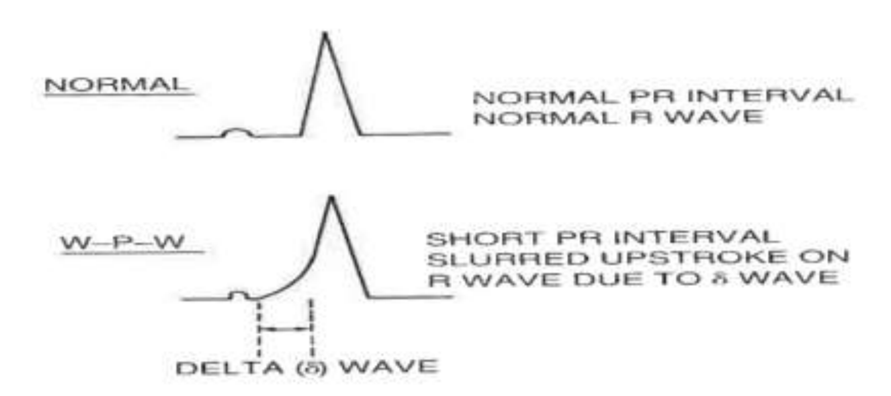
3- PR interval;- = segment + Wave normally 3-5 □

A. > 3-5 ……. 1st degree HB.
B. Gradual prolongation ….. Mobitz I.
C. < 3-5 ……. Either Nodal rhythm OR WPW.

WPW;- accessory pathway from atrium to ventricle أسرع من العادي

1)Wide QRS +2) short PR +3) Delta wave

علاجها Ablation





5-QRS;-

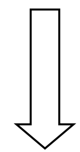
A. **Amplitude;-** normally summation I, II, III > 3□

B. If <3□ ;-

Emphysema or effusion or obiesty.

Normally

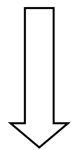
R < S in V1, 2



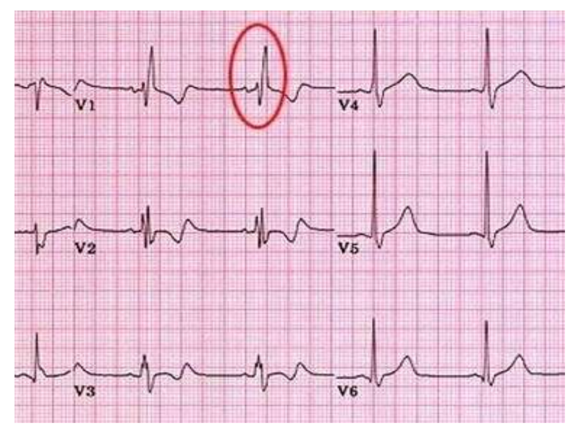
If reversed “R > S” in V1, 2

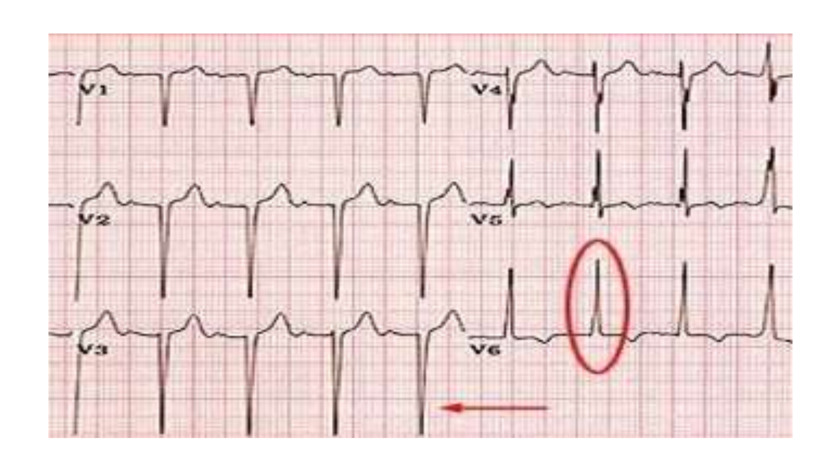
Rt Ventricular hypertrophy.

R > S in V5,6.



If reversed “R < 5 □ in V5, 6 OR S+R > 7 □”



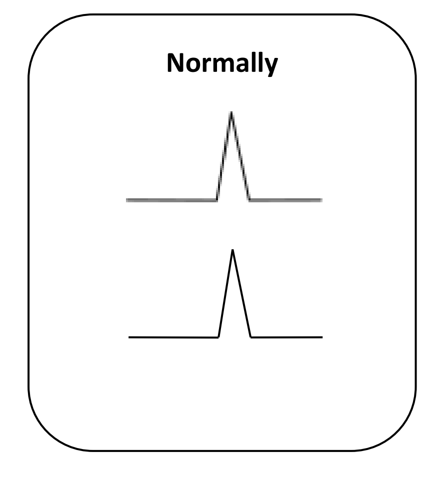


NB;-

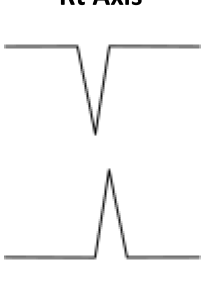
- M-shape in V1,2 >> Rt BBB, M-shape in V5,6 >> Lt BBB.
- BBB if already diagnosed تجُب MI.
- Infarction تجُب chamber enlargement.
- Any recent ECG changes; especially Lt BBB, we can’t exclude ischemia.

C. **Axis**; - lead I and aVF. احتمالاته

Normally



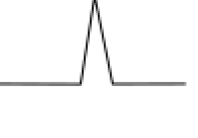
Rt Axis

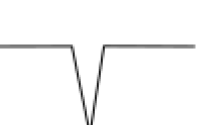


Low diaphragm أسبابه

1- Tall.
2- Thin.
3- Rt ventricular hypertrophy.
4- Rt BBB.
5- Infarction.

lT Axis

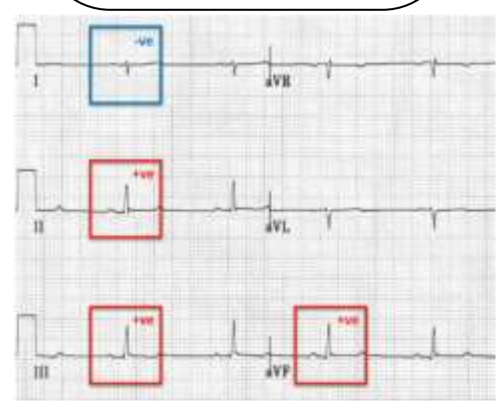


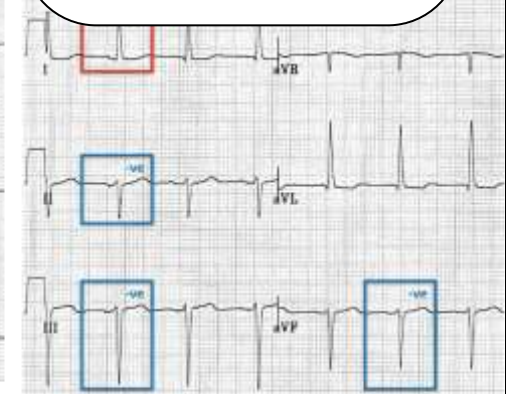


High diaphragm أسبابها

1- Short.
2- Obese.
3- Ltventricular hypertrophy.
4- Lt BBB.
5- Infarction.







D. **Pathological Q wave;-**indicates the presence of an ongoing or an old myocardial infarction.

1)Length > 1/3 R wave. OR
Width > 1 □
2)Topographic distribution

Leads بندور عليها فى كل ال

لازم نبقي تابعة ل

topographic distribution

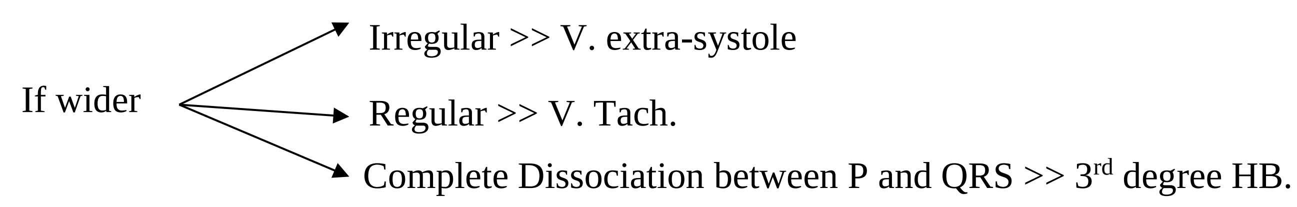
E. **Configuration;-** R wave propagation.

V2,3,4 >>>> بتزيد dramatically >>> if not poor R progress.

أسبابها

- Lt ventricle ضعيف …… Infarction or cardiomyopathy.
- Rt ventricle قوي ……. Hypertrophy.

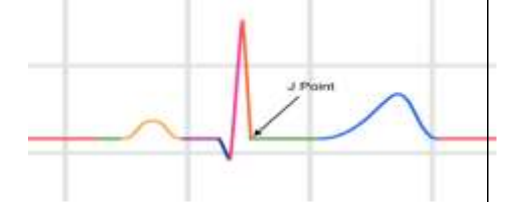
F. **Duration** = Width;- normally 3 □



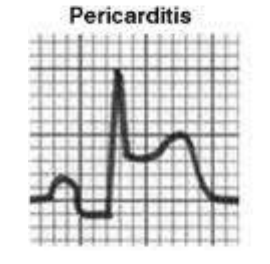
If wider → Irregular >> V. extra-systole
→ Regular >> V. Tach.
→ Complete Dissociation between P and QRS >> 3rd degree HB.

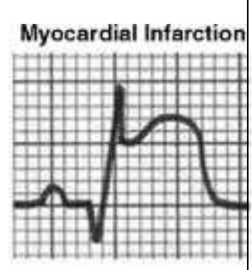
4- ST segment;- normally isoelectrical بنفرق من ال J point

A. **Raised**;-



One small square enough to diagnose ST segment elevation topographic except **V2 ,V3**→Female ≥1.5 small squares
→Male > 40yrs →≥2 small squares
→Male <40yrs→ ≥2.5 small suares **V7,V8,V9** →≥ 0.5 Small square =STEMI





- Convex and demographic….. Recent infarction.
- Concave and in all leads …… Pericarditis.
- Slight elevation and demographic …. Variant angina.



- **Once suspect ST** →look immediate for reciprocal changes.

B. Depressed;- old ischemia.

5- T Wave;- leads بنبص عليها ف كل ال

Normally < 2 ☐ in chest leads and < 1 ☐ in limb leads. مشاكلها

- Depressed ⇨ ischemia.
- Hyperacute ⇨ hyperkalemia , hypervolemia or ischemia.
- Sagging ⇨ straight ventricle, Digitalis and bundle branch block.
- Flat ⇨ straight ventricle, Digitalis, ischemia and bundle branch block.

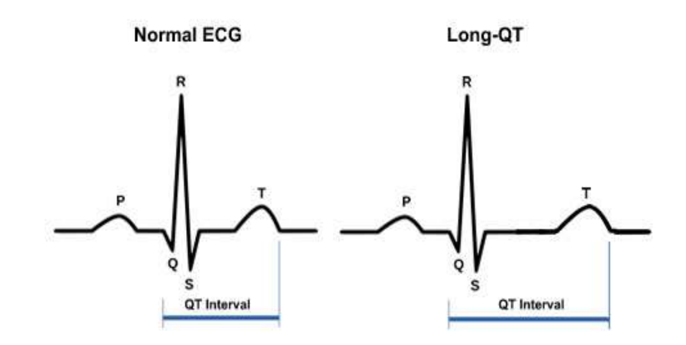
N.B; T wave may be depressed in II, III, aVF, aVL, V1, 2 in obese or large breast.

و ساعتها نهتم نسأل عن ال Functional Capacity .... لو كويسة خلاص بننيم عادي.

6- QT Interval;- (2 waves "QRS, T" + ST segment) prolonged if > 2☐

Causes are;-

- Quinidin.
- Procainamide
- Azole derivatives.
- TCA.
- Amphetamine.
- Cimitidine.
- Lithium.
- Norvasc
- V fend



Any arrhythmia >> comment on QT interval.

Corrected QT= QT/$\sqrt{RR}$.

N.Bs;

1. If Rt BBB + Lt Axis = bifasicular.
2. Indications for pacemaker;- 3^{rd} degree HB, Mobitz type II, Trifasicular Block "Lt axis, Rt BBB & 1^{st} degree HB".

BASICS OF ECHO VIEWS



1- تطلع السرير لبره علشان تملك العيان
2- تقعد على الجنب اليمين عند وسط العيان.
3- اتأكد انك قاعد على مكان ناشف.
4- ستر المريض ومايكونش مكشوف على العيانين اللى حواليه مهم جدا وانك تستأذن العيان وتشد الستاير اللى حواليه.
5- الجاون بيترفع من تحت وبتغطى المريض بملايه.
6- لو female موجوده ترفع ال breast بالجاون لو العيانه ست.
7- أتأكد ان ال probe مظبوط على adult cardiac وهتلاقى العلامه على الشاشه يمين عكس ال abdominal
8- تظبط ال depth بحيث تشوف القلب كله على الشاشه.
9- امسك ال probe زى القلم وايدك مريحه على صدر العيان.
10- تظبط ال TGC (الزراير اللى على اليمين) زى اللى فى الصوره ممكن تلعب فيه بحيث يبقى احسن visualization .



11- حط gel على ال probe
12- اعمل pressure حوالى كيلو ولو عيان obese هتحتاج تضغط اكتر.
13- لازم ايدك ثابته فى space
14- تمسح ال gel بعد ماتخلص وبعدين بحاجه مبلوله علشان الجل بيلزق جسم العيان.
15- لازم تشوف فيديوهات كتير وتعمل قدام حد كبير كتير الموضوع كله بالتكرار لان العيان مختلف جدا عن الكلام
16- هات اى حاجه بتدق و غير ال position

Probe movements :

- Clockwise
- Anticlockwise
- Tilting Caudal لو القلب مش مفتوح كويس
- Tilting Cephalic لو القلب مفتوح اوى
- pandoling.

Basics ECHO views :

1-parasternal long axis.
2-parasternal short axis.
3-Apical four.
4-subcostal view.

في كل واحد لازم تعرف:

1-هتحط ال probeفين ؟؟
2-ال knobعند الساعه كام ؟؟
3-هتشوف ايه ؟؟
4-tips and tricks of each view

اى view هتشوف الاتى او بعضهم :

1- يمين RT ventricle dilated or not
2- شمال contractility
3- بره pericardial effusion
4- جوه volume

- ماتحكمش على حاجه من view واحد لازم كذا viewعلشان تحكم صح

- **Dilatation of Rt side** if
  1-size > 0.6 in apical four provided septum is perpenicular,
  Or >1 in long &subcostal in comparison to Lt
  2-thromus inside
  3-TAPSE (Tricuspid Annular Plane Systolic Excursion)
  4-McConnell sign:hypokinesia of apex
- **NB** TAPSE<17mm indicate Rt ventricle systolic dysfun. ,<14mm indicate poor prognosis in pt with CHF

1- ***Parasternal long :***



هتحط ال probeفين ؟؟؟

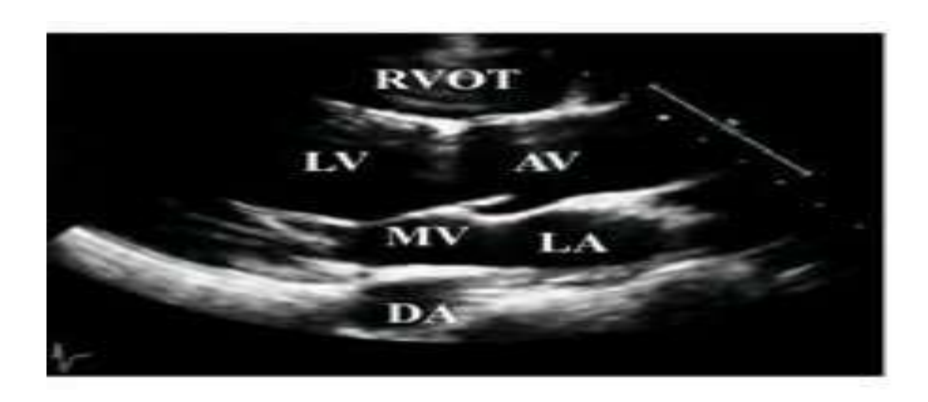
-usually between 3rd &4th intercostal space.
-left parasternal.



ال knobعند الساعه كام؟؟

- pointing toward Lt shoulder 10 Oclock.

هتشوف ايه؟؟؟



هتحكم على ايه ؟؟

- Contractility septum &inferior
- Mitral valve movement give an idea about contractility
- Rt side if bulging means Rt side diltation
- Pericardial effusion

Tips and tricks :

- Make Aortic Valve and Mitral Valve in the center of the image
- Make Aortic Valve cusps appear symmetrical.
- Make the Interventricular septum and post wall appear horizontal
- Not visualize apex.

2-parasternal short :

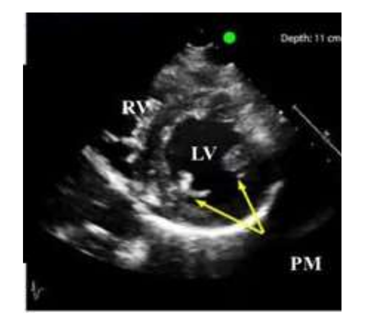
هتحط ال probeفين ؟؟؟



-Usually found between 3rd &4th intercostal .
- Rotate the probe 90 clockwise from parasternal long.(medial or lateral or pandolingاتحرك)



pointing toward rt shoulder 2 oclock.





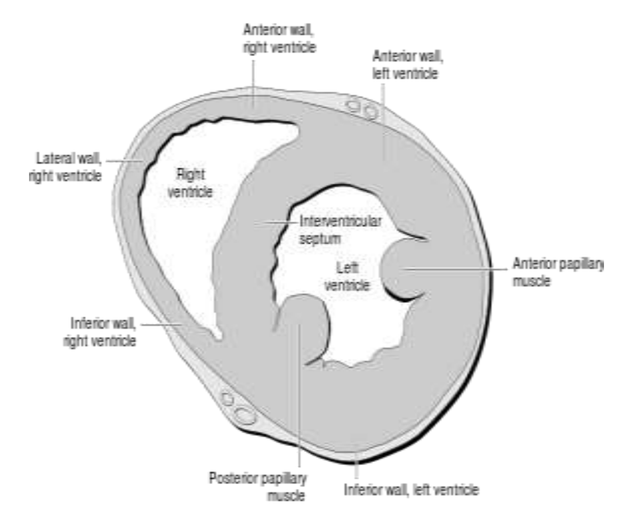
هتحكم على ايه ؟؟

- Contractility
- Volume (kissing sign)
- Rt side (dilated or not)
- Pericardial effusion

➢ Walls :SALPI تعرفهم بكلمة سلبى

S→septum A→Anterior L→Lateral

P→posterior I→inferior



Tips and tricks:

-Place Lt Ventricle in the the center of the image .
-Make the Lt Ventricle appear round in shape and Rt Ventricle crescent in shape.
-Visualize both papillary muscles attached to Lt Ventricle wall.

Advantage:

Visualize all walls

Disadvantage :

Not visualize apical part &basal part , you can overcome this by tilting probe cephalic &caudal

2- *Apical four:*

هتحط ال probeفين ؟؟؟

-Feel for point of apex pulsationبايدك.

-Usually found between 4th &5th intercostal space .

Special cases in apical 4 :

a) Female obese : breast تضغط جامد فى نص ال

b) Difficult view:

1-خلى العيان ينام على جنبه الشمال او2- افصله من عند الفنتلاتورعلشان الهوا مايطلعش فى وشك وصوت ال pulseعالي (مهم جدا).

c)COPD patient or ventilated: apical four ممكن تلاقى الcostal marginتحت شويه عند ال

d) Cardiomyopathic patient: depthهتلاقى ال apical 4 عند ant axillary ولازم تزود ال

ال knobعند الساعه كام

-pointing toward 3 oclock.

هتشوف ايه ؟؟

-Septum should be prepindicular

لو مايل يمين اطلع بره شويه lateral ولو مايل شمال ادخل medial

لازم تتأكد انه فى النص علشان ماتحكمش بالغلط ان ال rt side dilated

تحكم على ايه ؟ a)Contractility b) Rt side dilatation c) Pericardial effusion



Tips and tricks:



-ensure all 4 chambers are seen

-make the Interventricular septum appears vertical and in the center

-Don’t visualize aortic valve

-best view by tilting caudal or cephalic افتح واقفل القلب

Limitation :Don’t visualize antroposterior walls but you can visualize it in apical 3 by directing probe toward Rt shoulder showing septum &anterior.

4-subcostal 4 chamber :

هتحط ال probeفين ؟؟؟



-In the subxiphoid region.
-Flat and push down with slight tilt to patients right.
هتحشر ال probeكأنه قلم تحت ال costal margin



- pointing toward right 3 oclock





Tips and tricks:
-View all 4 chambers .
-See entire LV including apex (rotate the probe).
-Don’t visualize aortic valve.
Short axis if knob at 12 am

5- Subcostal IVC:



هتحط ال probeفين ؟؟؟

-In the subxiphoid without compression

علشان تجيب حته من القلب.

-From subcostal 4 rotate the probe 90 conterclockwise.(prepenicular)

ال knobعند الساعه كام

-Index marker pointing toward 12 oclock.



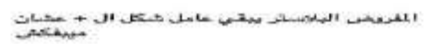


هتحكم على ال IVCعلى بعد 1سم من دخلة ال hepatic veinفى ال portal vein

NB: May be difficult ot visualize IVC in subcostal view especially in patient with abdominal exploration to overcome this , assess it transhepatic (anterior axillary line on the same line of xiphoid process .

*

Miscellanous & chronic devices



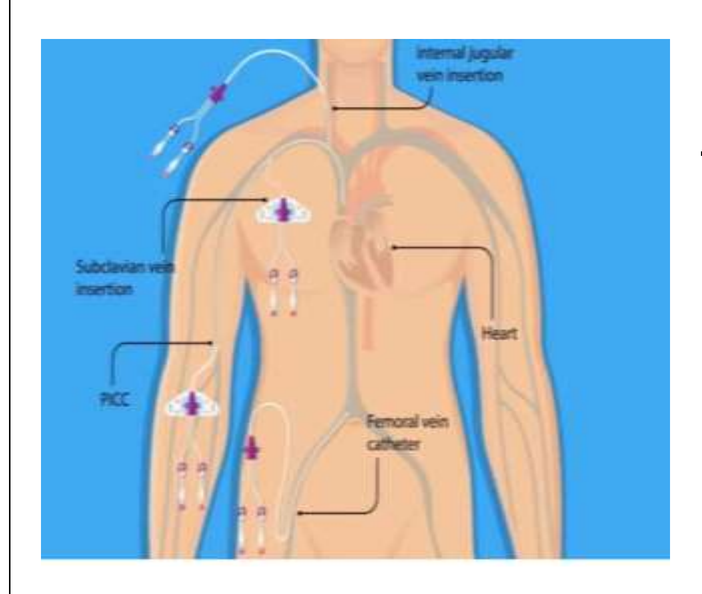






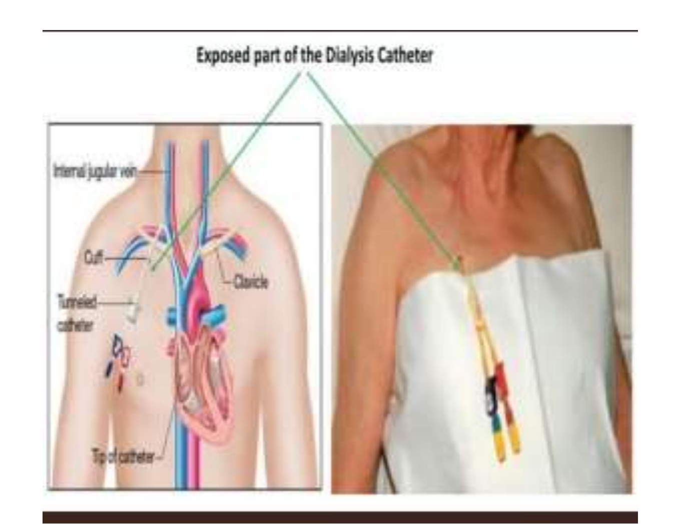






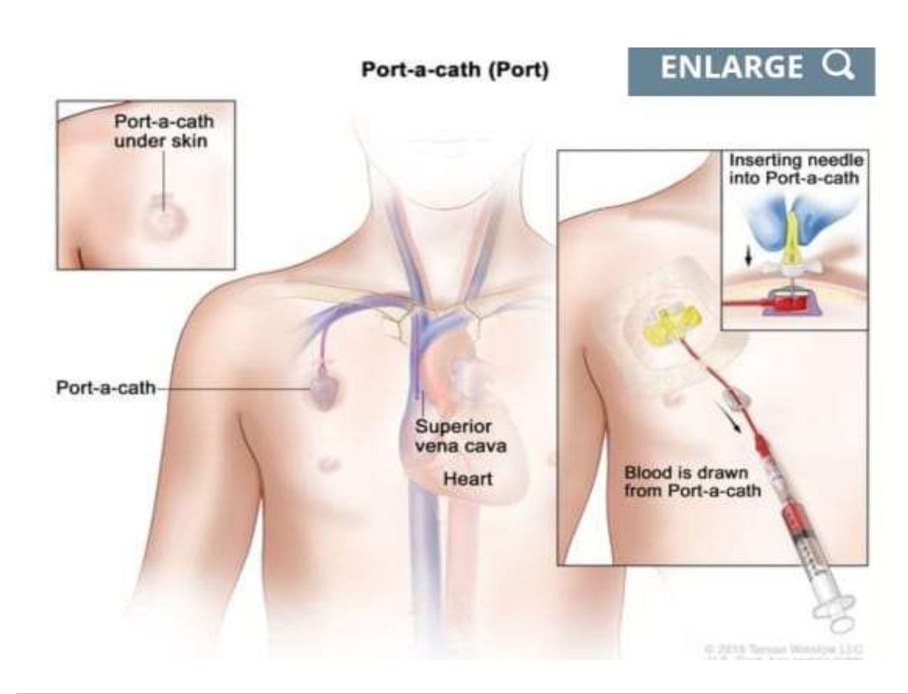
Central lines





permcath

Double & triple lumen mahurkers

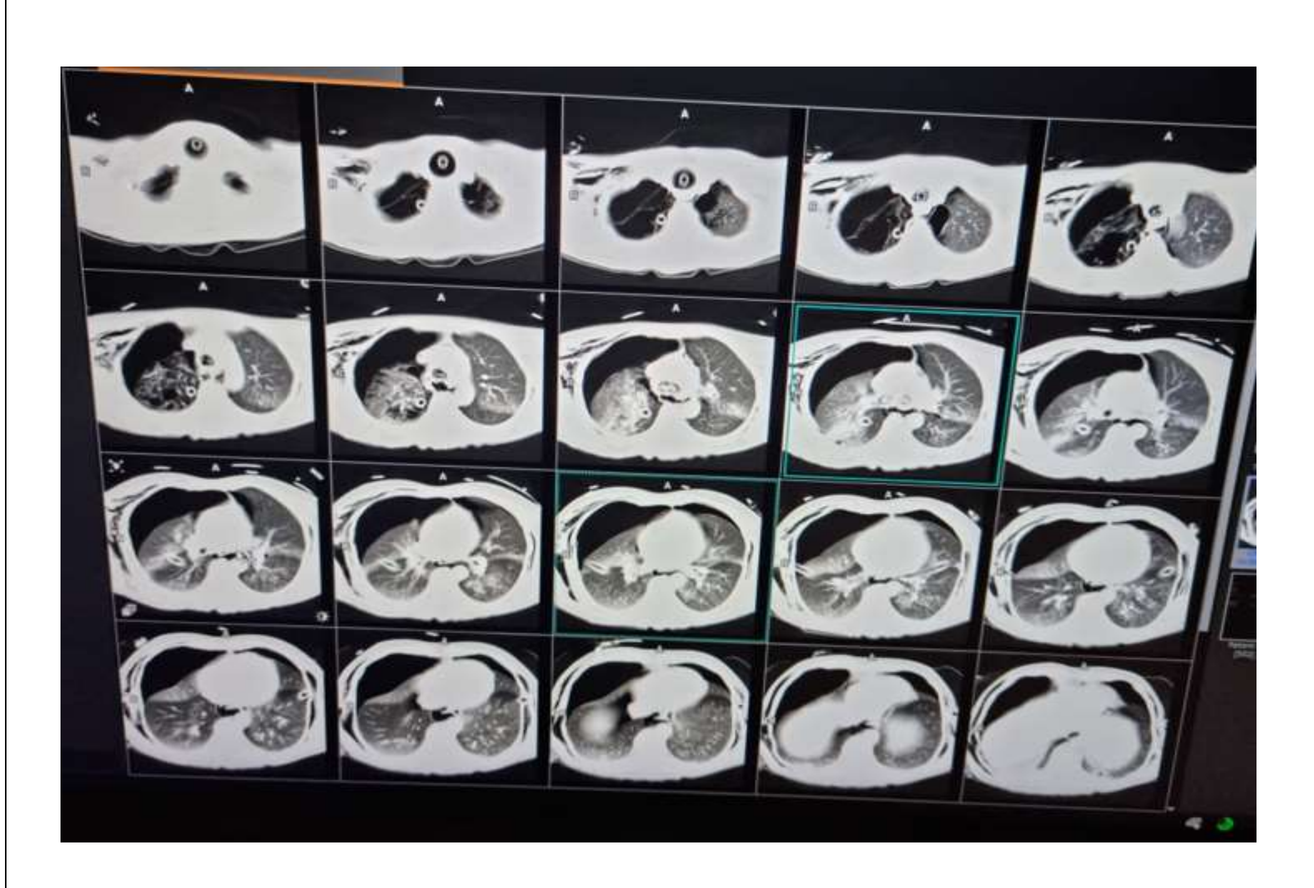


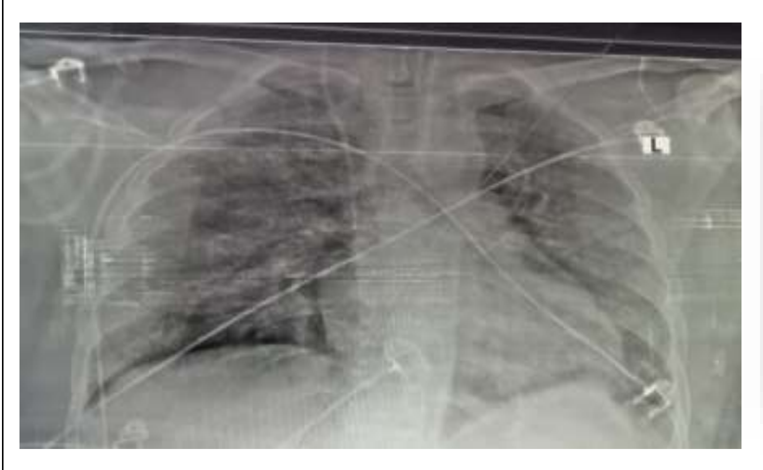
Portacath

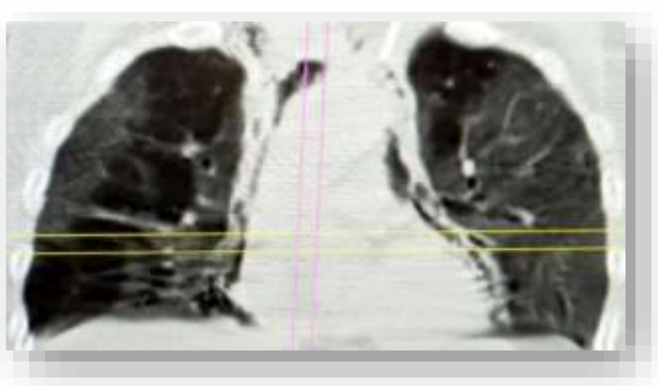
CT CHEST

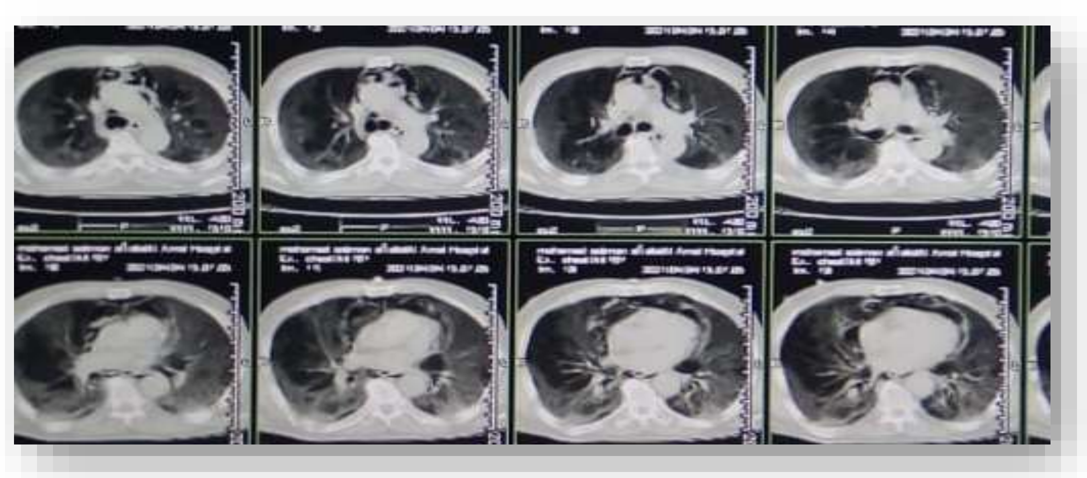


Pneumothorax & surgical emphysema

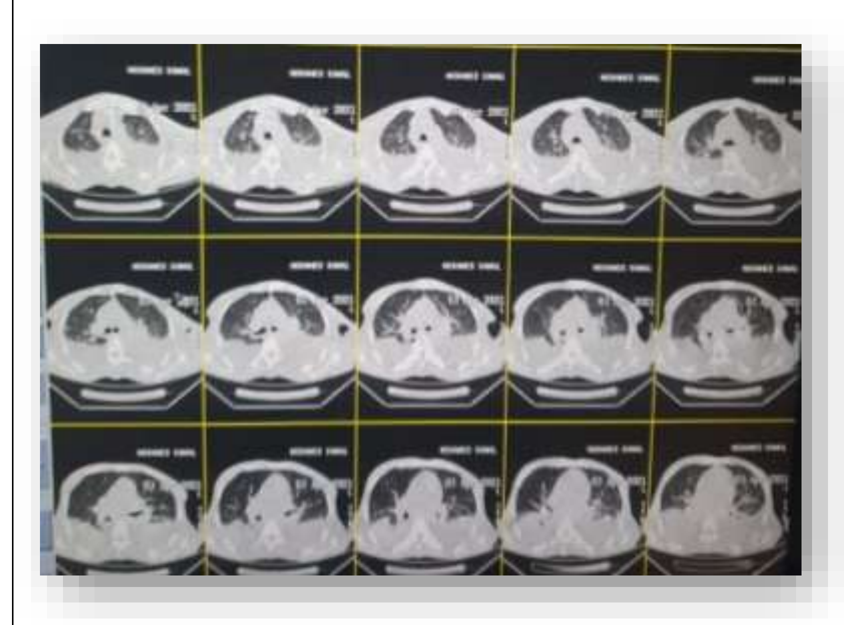








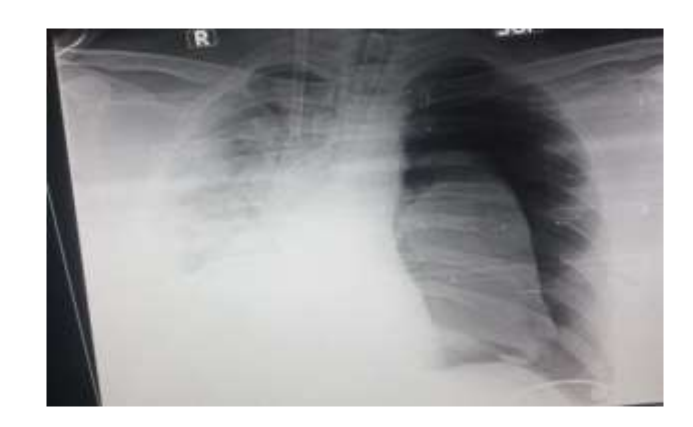
pneumomediastinum





Pleural effusion



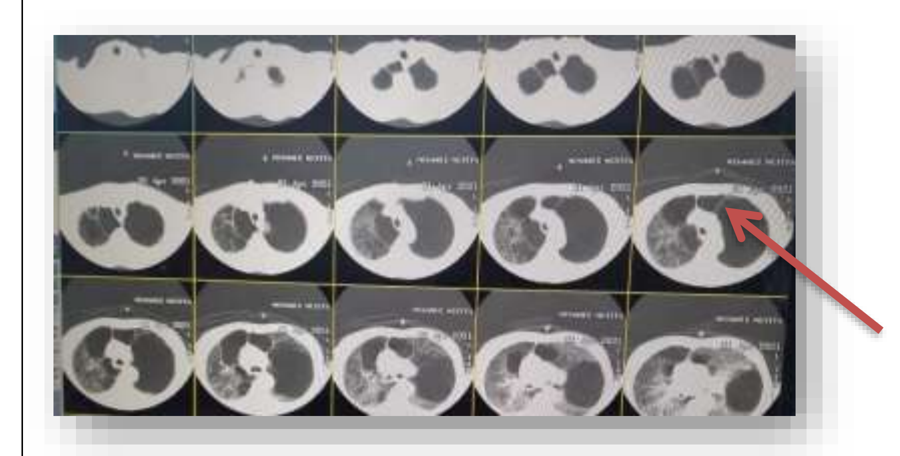


chest tube

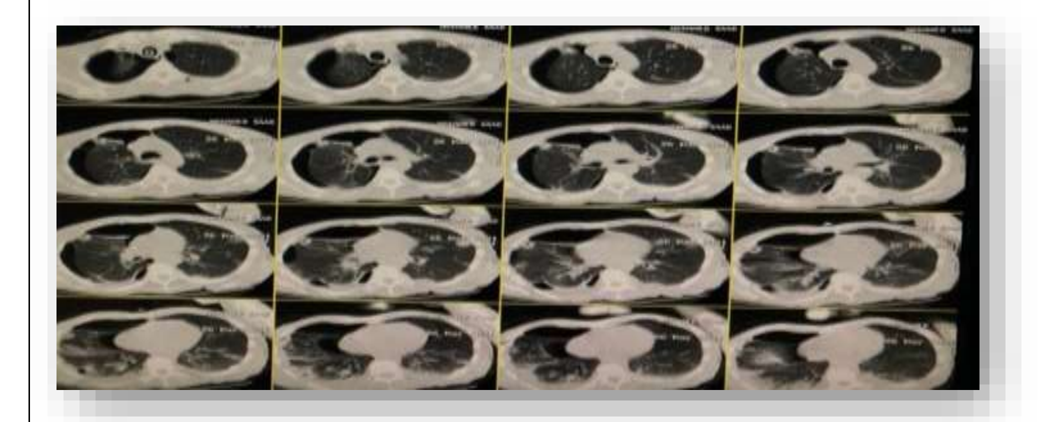




Pneumothorax



Emphysematous bullae



Rt Chest tube

NODULAR LESIONS

- Bacterial pneumonia
- Aspergillosis
- Nocardiosis
- Mucormycosis

- Sputum and blood culture
- Antigenuria
- Sputum with mycologic culture
- PCR Aspergillus and mucormycosis
- Galactomannan, BD-glucan
- Bronco-alveolar lavage

SEPTAL THICKENING

- Atypical bacterial pneumonia

- Sputum and blood culture
- Antigenuria
- Broncho-alveolar lavage

CAVITATION

- Mycobacteria
- Histoplasma
- Bacterial pneumonia (*S. aureus*)

- Sputum and blood culture
- Mycobacteria culture
- Histoplasma PCR

EXCAVATED NODULES

- Bacterial pneumonia
- Mucormycosis
- Nocardiosis
- Actinomyces
- Aspergillosis

- Sputum and blood culture
- Mucor PCR
- Nocardia PCR
- BD-glucan
- Galactomannan
- Aspergillus PCR

MICRONODULES

- Bacterial pneumonia
- Viral pneumonia
- Mycobacteria

- Sputum and blood culture
- Multiplex virus PCR
- Mycobacteria culture
- CMV, VZV, HSV, PCR

GROUND GLASS OPACITIES

- Pneumocystosis
- Viral pneumonia
- Atypical bacterial pneumonia

- Sputum and blood culture
- Legionella antigenuria
- Induced sputum for Pneumocystis search
- BD-glucan
- Multiplex virus PCR
- CMV, VZV, and HSV blood PCR
- Broncho-alveolar lavage, Pneumocystis IF and PCR

PLEURAL EFFUSION

- Bacterial pneumonia
- Tuberculosis

- Sputum and blood culture
- Antigenuria
- Mycobacteria blood culture
- Pleural aspiration and culture

CONSOLIDATION

- Bacterial pneumonia
- Aspergillosis

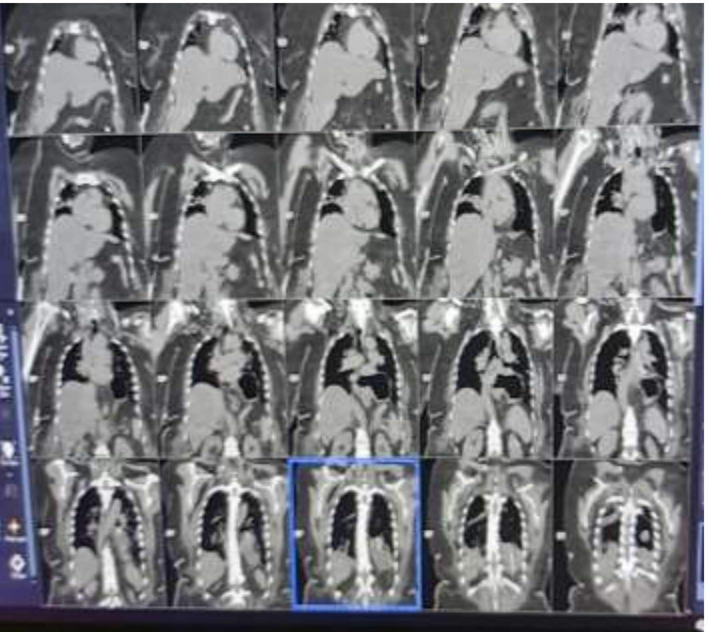
- Sputum and blood culture
- Antigenuria
- Mycologic sputum culture
- GM, BD-glucan





Covid 19 **ARDS due to pneumonia**





Diaphragmatic hernia in Coronal section

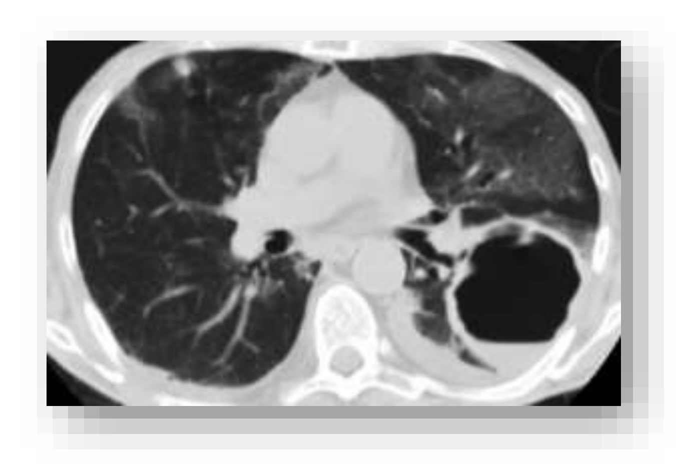




Lung mass

Lung metastasis



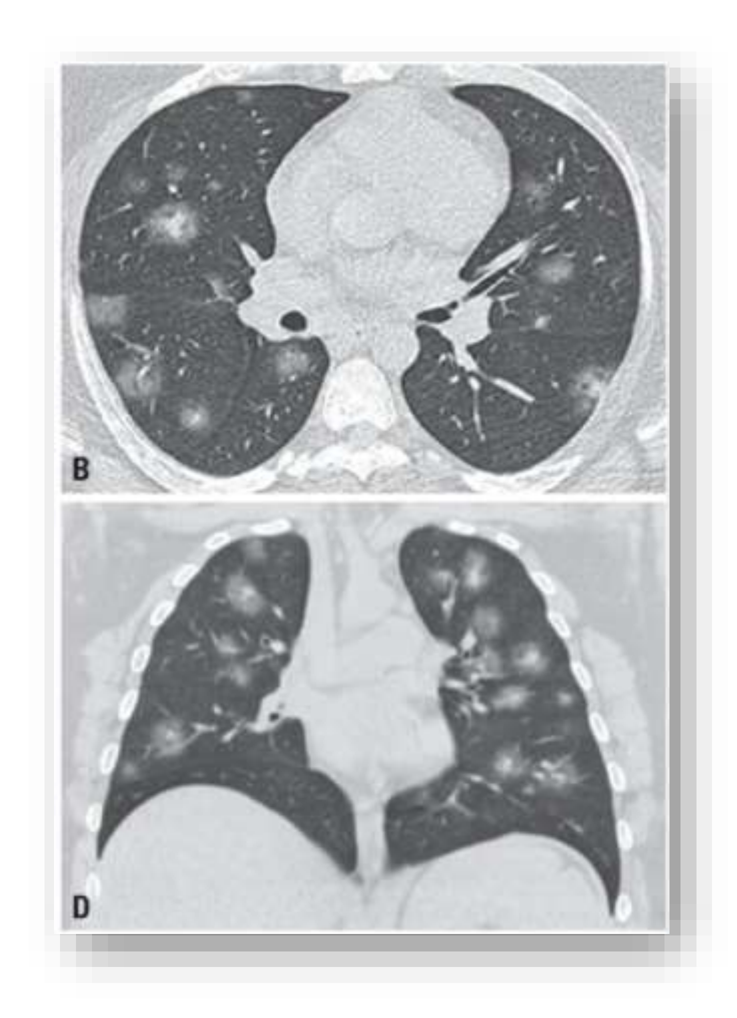


cardiac congetion

Rt lung abscess



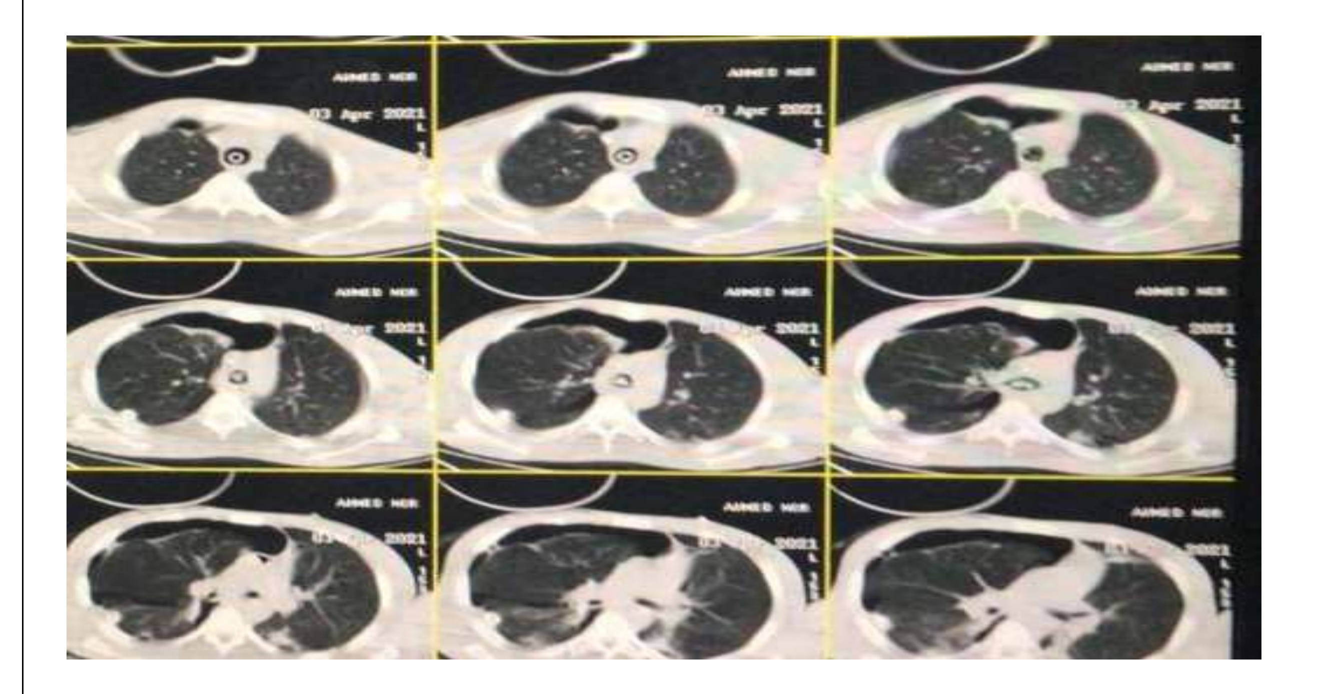
Pulmonary infarction



Fungal infection



Distended gastric air bubble

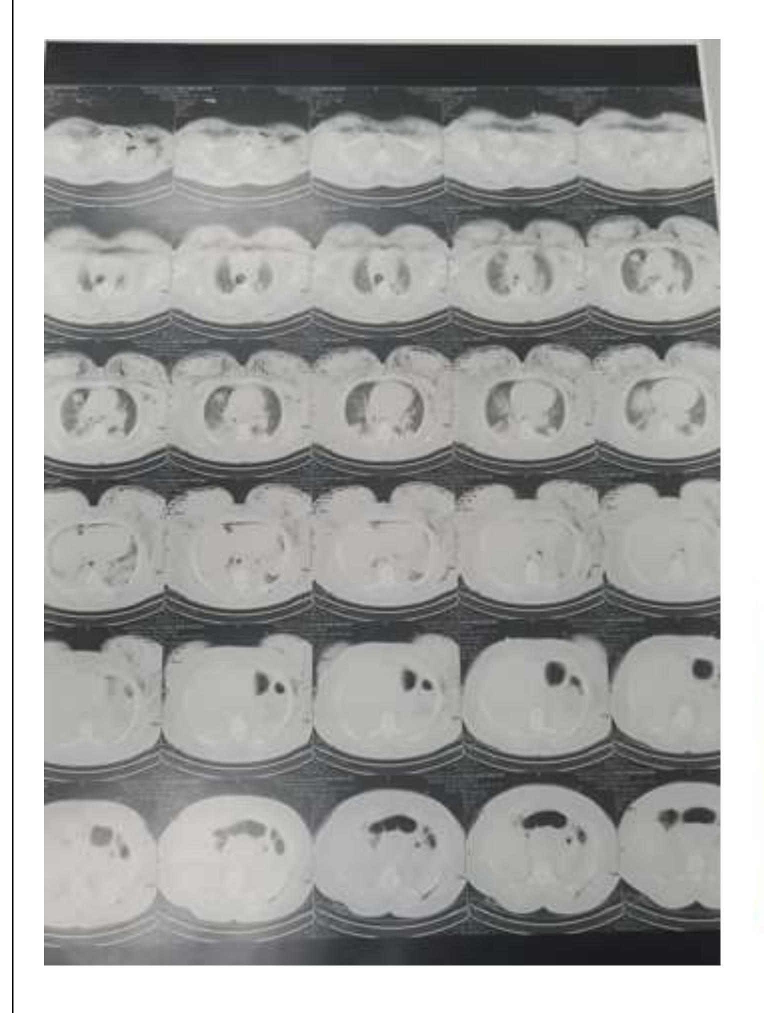


Mucus plug ,pneumothorax ,Rt chest tube,pleural thickening





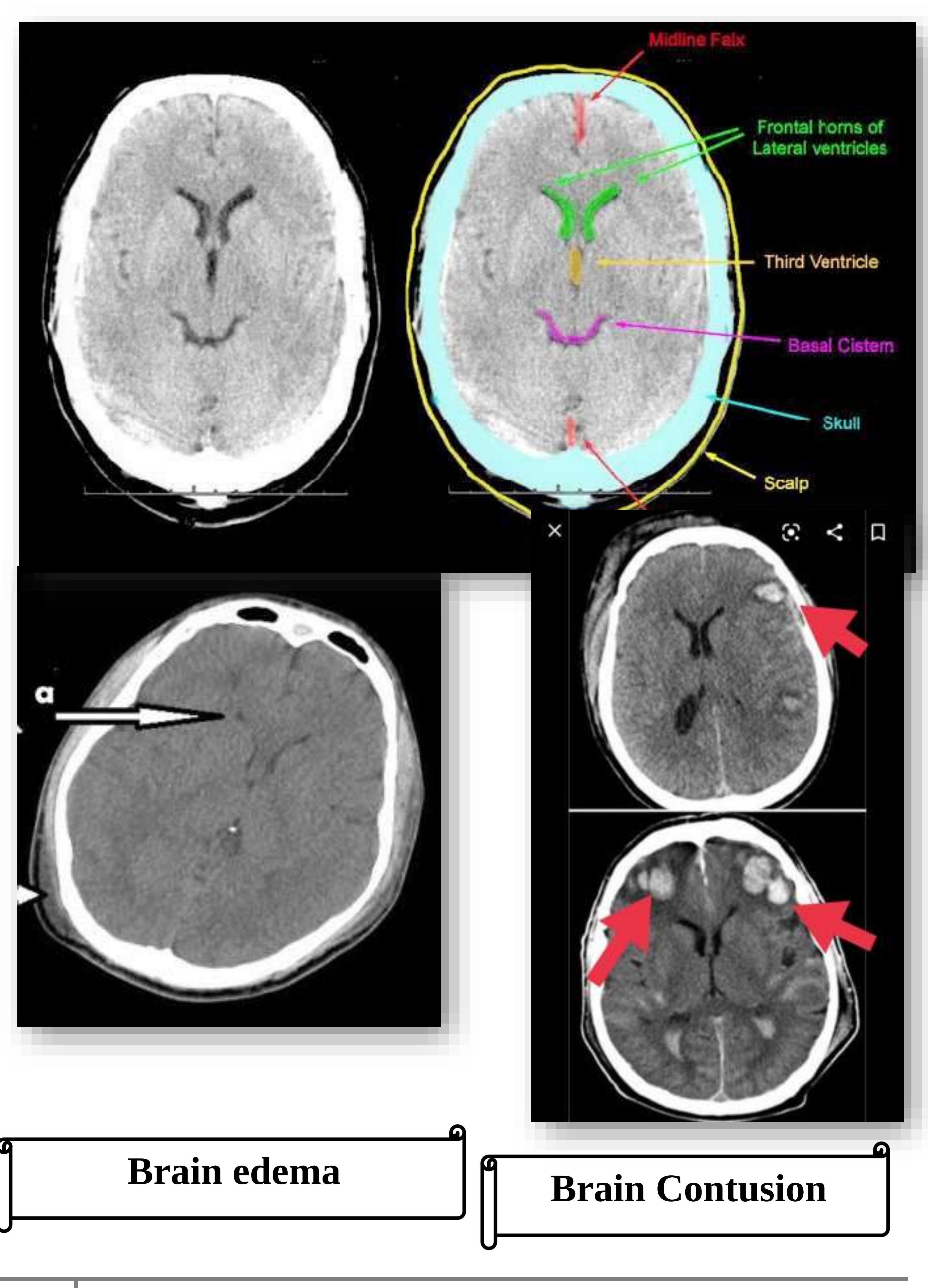
Lt IJV **Rt IJV**



Tracheal tear

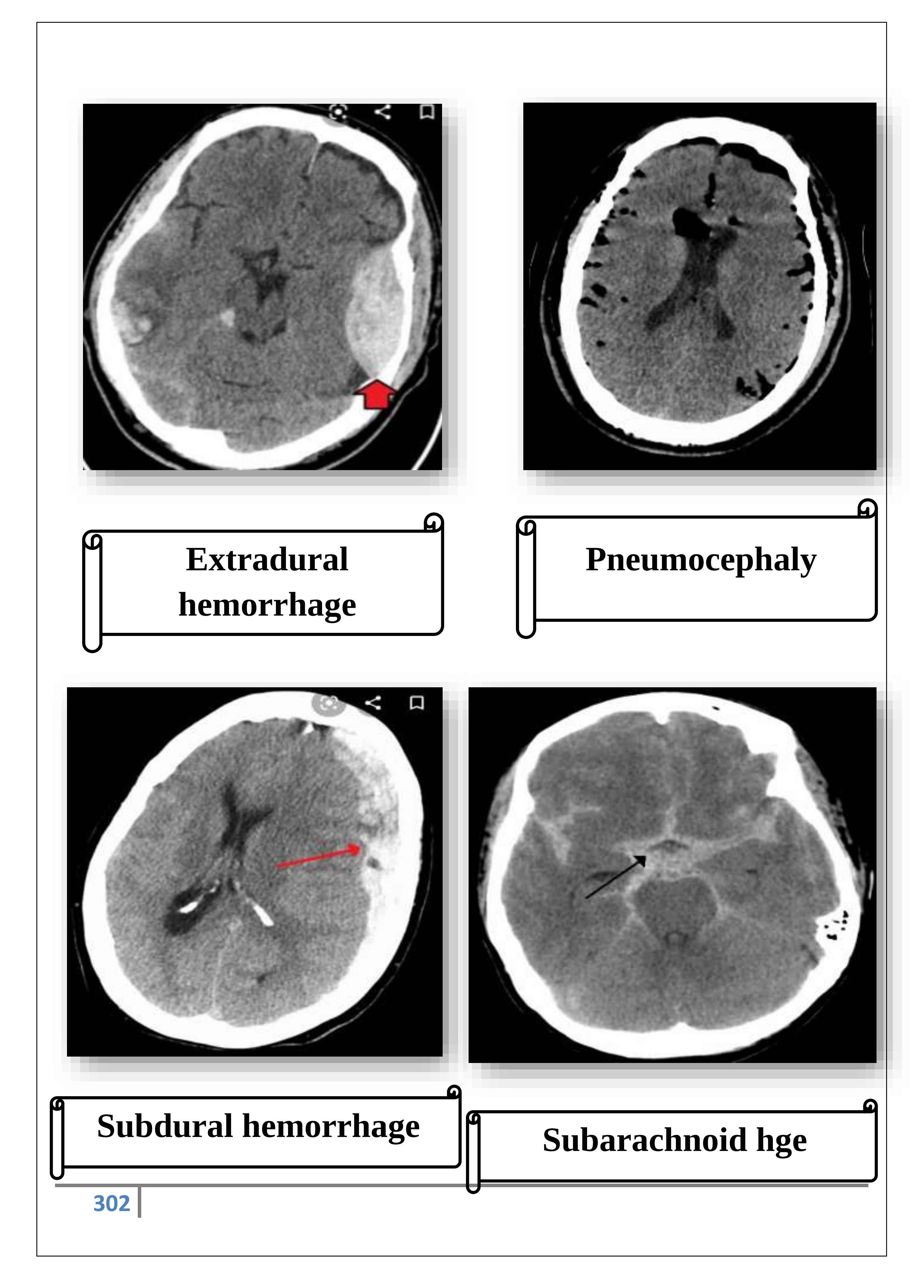


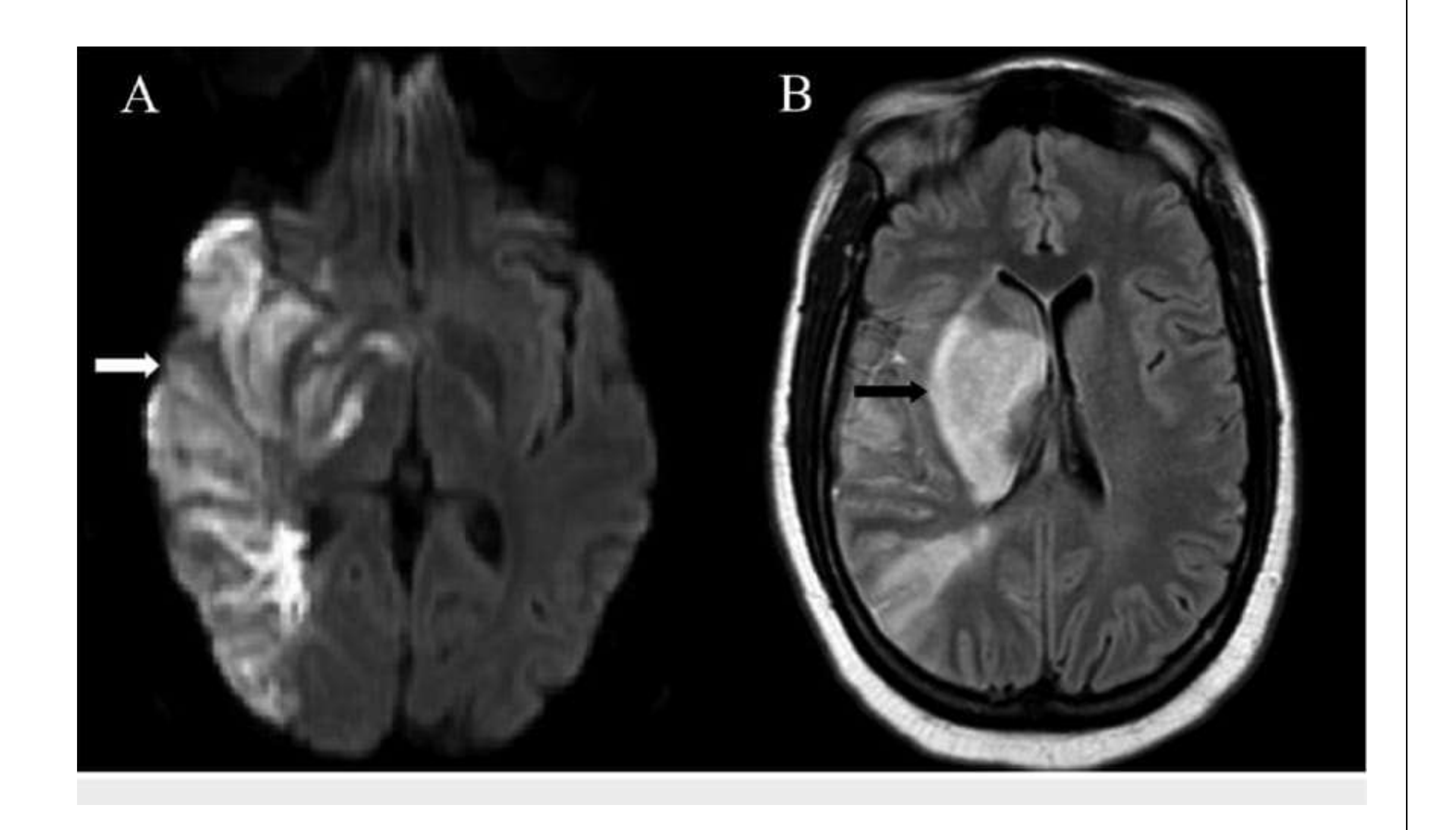




Brain edema

Brain Contusion


Extradural hemorrhage
Pneumocephaly
Subdural hemorrhage
Subarachnoid hge



MRI with diffusion: Acute ischemia

In MRI: the acute blood is colored as CSF, where the T1 is black and T2 is white





Mucormycosis

PROBLEMS

اعملها كويس ... العيان الواحد هياخد من ربع لنص ساعة ... مش الهدف إنك توصل لـ **diagnosis & treatment** في كل الـ **checklist** ... لكن الهدف معرفة المشكلة عشان توضحها في المرور .

	Diagnosis	/	/	/	/	/	/	/	/	/	**Yes**	**No**	**Done**
Chronic													
Acute													
CNS	DCL (191) Convulsions (199) Fracture spine (190)												
CVS	Shock (108) Active bleeding (114) Chest pain (127) Arrhythmias (143) Hypertensive emergency (47) Infective endocarditis (179) Limb ischemia (218)												
Respiratory	Hypoxia (27) ARDS(86) Flail chest (93)												
GIT	Vomiting (24)												
Hepatic (history, or accidentally discovered)	Hepatic encephalopathy (228) Hematemesis (229) Hepatorenal syndrome (231) Spontaneous bacterial peritonitis (230) Hepato-adrenal syndrome (231) Hepatopulmonary syndrome (231)												
Renal	AKI (209) CrCl &adjust												
Blood gases	Acidosis & Alkalosis (97)												
Labs & cultures	↑or↓K (1214-215) ↑or↓Na (201-201)												
Balance + trend													
Others													

اعملها كويس ... العيان الواحد هياخد من ربع لنص ساعة ... مش الهدف إنك توصل لـ **diagnosis & treatment** في كل الـ **checklist** ... لكن الهدف معرفة المشكلة عشان توضحها في المرور .

Chronic devices problems	/	/	/	/	/	/	/	/	/	**Yes**	**No**	**Done**
ETT: adequate length & proper fixation **Peak (75),pediatrics (75)**												
CVL (58)												
Tracheostomy (54)												
Chest tube (57)												
Surgical wound (25)												
Stomas (25)												
Bed sores and or pressure points (42)												
Urinary catheter (60)												
Ventilator (63)												
Nutrition: volume & type (244)												

Body	/	/	/	/	/	/	/	/	/	**Yes**	**No**	**Done**
Head & neck												
Upper limbs												
Abdomen & back												
Lower limbs												